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(9) HISTORICAL DATA

ST. LOUIS CWS PLANT

(To end of 1943 and supplements bringing study through March 1945)

Prepared by St. Louis CWS Plant, in accordance with Memorandum, SPCWJ 000.4, 30 October 1943, from Industrial Division, OCCWS.

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MONSANTO CHEMICAL COMPANY
St. Louis, (4), Missouri

August 18, 1944

Colonel Harry R. Lebkicher
Army Service Forces
Headquarters
Chicago Chemical Warfare Procurement District
Room 1600, Civic Opera Building
Chicago 6, Illinois

Dear Colonel Lebkicher:

We have compiled the activities of the Chemical Warfare plants at Monsanto, Illinois, in a chronological order and have briefly commented on the various types of contracts which have been handled. As stated, this covers only the activities of the Chemical Warfare plants and does not cover work done by the Monsanto Chemical Company at its own plants in behalf of the Chemical Warfare Service. We would like very much to have you advise us whether you desire information concerning what Monsanto has done in its private plants for your service. It is possible that you will desire additional information on the following:

On about May 1, 1941, Monsanto Chemical Company was requested to undertake first the construction and later the operation of a plant for the manufacture of Thermogenite I (CC-2). The original plant was designed by duPont Chemical Company from data derived from pilot plant experiments conducted at the duPont Electrochemicals Plant at Niagara Falls, New York, and at the Edgewood Arsenal.

On July 11, 1941, Monsanto, as prime contractor working with the Corps of Engineers, started on Contract No. W-266-cws-119, the erection of a plant based on the duPont design on a tract of 5.757 acres purchased by the Chemical Warfare Service directly north of the Monsanto, Illinois Works. The project was completed in February, 1942, to the point where manufacturing could be carried out and preliminary operations were begun on February 16, 1942. This Monsanto construction project was completed at a cost of about $250,000 below the construction estimate and these funds were returned to the U. S. Treasury.

Severe corrosion difficulties, inadequate production facilities, poor ventilation, and numerous other troubles were encountered during preliminary operation. These difficulties were not apparent from the duPont pilot plant results. After four or five months, the plant capacity was about 5,000 pounds per day instead of the rated 10,000 pounds per day. Other plants and Edgewood Arsenal were experiencing exactly the same difficulties and their performance was about the same as Monsanto's.

All of the plants then set out on a program of repairs, alterations, and expansion which was to enable each group to attain the production in whatever manner they saw fit. Following this plan, Monsanto was able to steadily increase the output and reach the rated 10,000 pound plant capacity by the end of November, 1942. Continued study and further plant improvements steadily expanded this production capacity of the original plant to 15,000 pounds per day by October 28, 1943.

Along with the operation of the plant and the program for increasing capacity, Monsanto's Research Department had contracted to study the chemical aspects of the problem. Fundamental research led to a better understanding of the process and resulted in steady improvements in both yields and quality. These improvements in research and manufacturing technique were best reflected in the reduction in cost to the Chemical Warfare Service--which cost, on November 2, 1943, was less than one-third of what it had been during the first contract. In addition to the substantial reduction in the cost to the Chemical Warfare Service with each succeeding contract, Monsanto returned profits for the years 1942, and 1943 amounting to more than $1,533,000.00.

In September or October 1942, the requirements for CC-2 were greatly increased. An expansion program became necessary. Our company was asked to design and erect on 7.063 acres of land purchased at this site a plant capable of expanding deliveries of CC-2 to 20,000 pounds per day. The plant was to be of temporary construction. Similar contracts were let with duPont and Dow; each plant being allowed to expand according to their own plan. In Monsanto's case, however, we had been asked by Chemical Warfare Service, Industrial Division, to design a plant which would have 10,000 pounds per day capacity and which could be used as a standard or type plant should such plants be desired other than the expanded units at duPont, Dow, and Monsanto. Simultaneously with this, we contracted (Contract No. W-1103-Eng-3857) to act as Architect-Engineers for the erection of the proposed plant. Thus it developed that we began in December, 1942, the design and simultaneous construction of a 10,000 pound plant separate and distinct from the original operating unit. In the new plant we incorporated all of the experience we had obtained and improvements which had been developed in the old plant.

On December 20, 1943, the new unit was placed into operation and production in the combined plants (old and new) reached 24,730 pounds per day, or 173,074 pounds per week, by January 6, 1944. Costs were reduced to an unprecedented low figure. Plans were formulated for several improvements which were expected to further increase production and to reduce costs.

In January, 1944, accumulated stocks of CC-2 led the Chemical Warfare Service to curtail operations in its three plants then operating. Monsanto discontinued production in the old CC-2 plant and began placing it in stand-by condition. Production of CC-2 was continued in the new plant on a three-shift basis for several weeks. Finally on about May 5, 1944, production at Dow was discontinued and duPont and Monsanto operations further reduced. In our case, production was restricted to 185,000 pounds per month which is now being

made on a six-day-per week two-shift-per-day schedule. The flexibility which was an advantage of the Monsanto-type expansion was thus realized.

Simultaneously with the production of CC-2, Monsanto designed, supervised the erection of, and operated plants for two other secret Chemical Warfare Service products, Dichloramine-T and S-330.

The Dichloramine-T process was a Monsanto process, use of which was granted to the Government. While this process was a Monsanto process, it did not exist at the outbreak of the war. It was developed after a long laboratory and pilot plant investigation at the urgent request of the Chemical Warfare Service working with Colonel Fleming, of the Medical Division, Captain MacFarlane, and Colonel Kabrich (later General Kabrich). D.A.T. made in the pilot plant was supplied to the Chemical Warfare Service for their studies, and as a result, Monsanto constructed a small unit in one of its operating departments, using its own funds to the extent of $20,000. This was originally designed for 11,000 pounds per month, but finally a production of 30,000 pounds was obtained. This production was a big help in supplying the early demands of the Chemical Warfare Service. Monsanto had at all times pointed out that D.A.T. was a product which would cause irritations and would be unstable and would very likely cause skin troubles. However, at this time there was no better product available and the Chemical Warfare Service authorized the building of a large unit at Monsanto, Illinois.

On January 15, 1942, construction work was begun on the original D.A.T. Plant at the St. Louis Plant, Chemical Warfare Service, Monsanto, Illinois, from plans and specifications furnished as part of Contract No. DA-W-266-CWS-1, dated August 27, 1941. An area consisting of 2.918 acres was purchased at the St. Louis Chemical Warfare Service site for this plant. Initial operations were begun on July 24, 1942. Originally designed for a capacity of 40,000 to 50,000 pounds, production was gradually increased through operating efficiencies and miscellaneous improvements until a normal capacity of 90,000 to 100,000 pounds per month was reached. The yields were very good and the D.A.T. produced was of the highest quality. Beginning with July, 1942, Chemical Warfare Service future forecasts indicated the need for an increased amount of D.A.T. On July 24, 1942, a contract was signed to expand the D.A.T. Plant to 160,000 pounds capacity monthly. Construction of the plant addition was carried out by Monsanto and the Corps of Engineers along with the CC-2 Plant Expansion which developed in 1943.

Due to difficulties in the field use of D.A.T. and the discovery of a superior product, S-330, the D.A.T. Plant Expansion was never used. The operating portion of the plant was finally closed down on October 26, 1943. The D.A.T. project was non-profit venture with Monsanto and the profits from the contracts were returned as part of the $1,533,000.00 returned to the Chemical Warfare Service in 1942 and 1943.

In September, 1943, Monsanto undertook a contract with OSRD-NDRC to develop a process for the manufacture of S-330 which product had been demonstrated to be superior to the D.A.T. The process for the manufacture of S-330 was subsequently developed and worked out in the Monsanto laboratory.

During the latter part of 1943, a survey was made to determine whether the D.A.T. facilities could be converted for use in the manufacture of S-330. It was originally thought that the four steps of the S-330 process could be carried out at the Monsanto, Illinois plant. This possibility was discussed in Washington, D. C. with Colonel F. M. House, Lt. Colonels G. B. Kaufman and F. R. Johnson, Major Soissons, and Major M. S. Davis. A decision was finally made by the Chemical Warfare Service to divide the process between Merck and Company and Monsanto. Monsanto was to carry the last two steps. The D.A.T. Plant equipment seemed adaptable for the manufacture of the Step III intermediate and Step IV (S-330).

Contract No. W-49-057-cws-5, covering the "Design and Engineering for Rehabilitation of Department 265 for the Manufacture of S-330," was signed on January 2, 1944, and design work was begun immediately. On February 14, 1944, Contract No. W-23-065-Eng.-319 for the erection of new and rearrangement of old Department 265 equipment, was signed. Work was begun soon thereafter. Like the CC-2 Expansion Plant, this project had a poor priority rating. Despite this, the construction and procurement of materials proceeded well and the project was sufficiently completed for preliminary runs in the first steps (III-A and the solvent rectification unit) on July 3, 1944. The plant was completed about August 15, 1944.

While the S-330 unit was being designed and while construction and procurement of equipment were underway, the urgent need for S-330 necessitated the manufacture of this product by make-shift methods. A pilot plant contract, No. W-18-035-cws-265, was negotiated to produce S-330 on a semi-works scale. This involved an F-3 unit set up in a corner of the D.A.T. building and the transfer of the F-3 to the Queeny Plant for conversion into S-330. Originally designed as a unit for studying the process and for obtaining data for the large plant design, this pilot plant was utilized as a production unit, yielding 1,000 pounds per week at first but soon reaching 3,500 pounds per week. Still greater Chemical Warfare Service requirements led to an expansion of the pilot plant equipment in the D.A.T. building to furnish more F-3. A design and engineering contract, No. W-49-057-cws-8, covering the necessary alterations and installations for expanding the F-3 equipment in the D.A.T. building and converting part of the CC-2 equipment in the old Department 260 building for the "Interim" production of

S-330 until the new plant could be completed, was negotiated. On April 6, 1944, production was started in the Interim Plant in accordance with Contract No. W-11-021-cws-290. Production in this improvised plant was maintained at 50,000 to 55,000 pounds per month. In addition to this, sufficient F-3 was transferred to the Queeny Plant to permit the production of 15,000 pounds of S-330 per month in the Queeny pilot plant. On July 1, 1944, the Queeny Plant portion of Contract No. W-11-021-cws-290 expired. By alterations and improvements, the S-330 production in the equipment at the Chemical Warfare Service Plant was expanded to about 70,000 pounds per month to cover all Chemical Warfare Service requirements. In all cases, the production was of high quality, meeting all specifications. During the life of the contract, the price of S-330 to the Chemical Warfare Service was reduced to about 65% of the estimated cost or the cost on the original contract.

The main S-330 Plant was sufficiently completed on July 31, 1944, to permit production of F-3 and the recovery of alcohol. Thus far, these steps (III-A and the rectification unit) have been entirely satisfactory. No serious operating difficulties are expected from Steps III-B and IV which are scheduled for completion about August 15, 1944.

As of August 1, 1944, therefore, activities at the St. Louis Plant, Chemical Warfare Service, Monsanto, Illinois, may be summed up as follows:

Operation of the Expansion unit of the CC-2 Plant at the curtailed rate of 185,000 pounds of XXCC-3 per month.

Production of 70,000 pounds or more S-330 in the old CC-2 Plant and the pilot plant equipment remaining in the old D.A.T. Plant building. This combined equipment represents the "Interim" S-330 Plant.

Operation of a new S-330 Plant in the rehabilitation D.A.T. Plant to produce F-3 and recover solvent.

Preparations to test and put into service the remainder of the new S-330 Plant equipment for carrying out the final two steps in the S-330 synthesis.

With the exception of a possible increased requirement for XXCC-3, no new construction projects at this plant are imminent. A recent communication from the Office of the Chief, Chemical Warfare Service, Washington, D. C., however, required Monsanto to estimate the cost of expanding XXCC-3 production to a possible monthly figure of 700,000 to 900,000 pounds. Should this demand materialize, an extensive program to additions and alterations will develop.

The key personnel of Monsanto Chemical Company who have handled these operations are as follows:

William G. Krummrich - Division Production Manager, Organic Division
Paul M. Tompkins - Plant Manager, Monsanto, Illinois Operations
Joseph F. Stickley - Manufacturing Superintendent, CWS Plants
E. W. Mares - Production Superintendent, CWS Plants
Dr. L. P. Kyrides - Research Director, Organic Division
Dr. R. M. Hitchens - Ass't Research Director, Organic Division
Dr. O. J. Weinkauff - Ass't Research Director, Organic Division
Dr. H. R. Gamrath - Group Leader, Chemical Warfare Plants
H. L. Hubbard - Group Leader, Chemical Warfare Plants

Very truly yours

/s/ Wm. G. Krummrich
/t/ Wm. G. Krummrich
Division Production Manager

WGK/ds

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CC-2 PLANT

Manufacturing Superintendent of the CC-2 Plant is Mr. J. F. Stickley. Production Superintendent is Mr. E. W. Mares.

Major George W. Russell reported for duty at the St. Louis Plant, Chemical Warfare Service, to act as Plant Representative for the Chemical Warfare Service, on 16 June 1941. Major Russell departed from this plant 13 June 1942. At the present time Major Russell is on duty with the Corps of Engineers in New York, New York.

On 5 January 1942, Major Willard L. Finley assumed duties at St. Louis Plant, Chemical Warfare Service, as Commanding Officer. Major Finley was transferred from this station 10 August 1942. Major Finley is on duty with the Army Air Force, Army Air Force Depot, Gadsden, Alabama, at the present time.

Captain David W. Dick reported for duty at St. Louis Plant, C.W.S., and was assigned duties as Property Officer on 16 January 1942. Captain Dick was transferred to Edgewood Arsenal, Maryland 3 September 1942, and is on duty at Camp Sibert, Gadsden, Alabama at present.

Captain William J. Snoddy reported to the St. Louis Plant, C.W.S., 2 February 1942, and was transferred to Edgewood Arsenal, Maryland, 27 June 1942, and is on duty in the Hawaiian Islands at the present time.

Captain Daniel J. Pflaum reported to this plant 26 June 1942, and assumed the duties of Executive Officer. Captain Pflaum was transferred to Edgewood Arsenal, Maryland, 8 April 1943. At the present time Captain Pflaum is on duty with the Corps of Engineers, New York, New York.

Lieutenant Colonel Frank R. Johnson reported to this station as Commanding Officer 8 August 1942, and was transferred to the Office of Chief, Chemical Warfare Service, Washington, D. C., 12 April 1943, where he is on duty at present.

Lt. Eugene E. Nattie reported to the St. Louis Plant, C.W.S., 26 August 1942 to assume the duties of Property Officer. Lt. Nattie left this station 31 August 1943, and is on duty at the present time in the Office of Chief, Chemical Warfare Service, Washington, D. C.

Privates Jack Baxter and LeRoy Cook, Jr. reported to this station for duty as draftsmen 21 September 1942, from the Replacement Training Center, Camp Sibert, Gadsden, Alabama.

Sergeant Andrew D. Forsythe reported for duty at this station 17 November 1942 from Edgewood Arsenal, Maryland. Sergeant Forsythe left this station 3 December 1942 in order to attend OC Course Class at Fort Belvoir, Virginia.

CC-2 PLANT

Privates Cook and Baxter were recommended for Good Conduct Medals on 1 November 1943, recommendation was approved 3 November 1943 and award was made on 27 November 1943.

Privates Baxter and Cook left this station 27 November 1943, in order to attend non-commissioned officers gas course at Edgewood Arsenal, Maryland.

Captain Raymond J. Schadt assumed command of this plant 7 April 1943, and was transferred to the Chicago Chemical Warfare Procurement District 4 October 1943. He has now returned to civilian life.

Captain Edwin D. Wilson reported to this station 17 April 1943, and assumed the duties of Executive Officer. Captain Wilson departed from this station 5 April 1944 for Camp Sibert, Alabama.

Lieutenant Charles B. Lansdell arrived at this plant 4 June 1943 to assume the duties of Property Officer, and is on duty at this plant at the present time.

Major Jim T. Baughman reported to this plant as Commanding Officer 26 August 1943, and is Commanding Officer at this plant at the present time.

The CC-2 Plant, designed to produce five tons of CC-2 per day, was accepted from the Area Engineer on 16 January 1942, and went into operation 9 March 1942. On 15 April 1942 the first shipment of CC-2 was made from this plant. Work was started to construct additional facilities to increase the capacity of this plant from five tons of CC-2 per day to ten tons of CC-2 per day on 26 August 1943.

On 14 November 1942 this office was notified that it had been awarded the Army Navy "E". Presentation ceremonies were held 5 January 1943 at the Monsanto Chemical Company, Monsanto, Illinois. This plant was awarded the White Star on 24 December 1943, a Second White Star on 24,June 1944, and a Third White Star on 10 February 1945.

In June 1943 the St. Louis Plant, C.W.S., won the President's Safety Trophy for the first and second quarters of 1943; operating 183 days without a lost time accident. During the second quarter of 1944, this plant flew the green safety flag of Monsanto, indicating the lowest accident rate of all Monsanto plants for that quarter. A total of 305 days elapsed before the next lost time accident on 5 November 1944. There has now been 198 days (through 23 May 1945) since last lost time accident.

Production of micronized material was begun 10 October 1943. The last batch of micronized material was accepted on 28 October 1944.

ORIGINAL CC-2 PLANT

Contract No. W-266-CWS-119 — 4 November 1940

St. Louis Plant, C.W.S., Unit No. 1., consisting principally of -
- Manufacturing Building
- Lime Plant
- Storage Tanks
- Pump House and three deep well pumps
- Change House and shop
- Garage and Fire House
- Office and Laboratory Building
- Electric Substation
- Gate House
- Storage Shed
- Railroads with track scales
- Car spots
- Fire hydrant houses
- Incinerator
- Necessary water, steam, sewage, electric and gas supply systems

Prime Contractor - Monsanto Chemical Company

Original Estimate - $2,414,480

Cost - $2,157,012

Date Started - 1 February 1941

Date Completed - 15 January 1942

Date Accepted from Area Engineer - 16 January 1942

CC-2 OPERATING CONTRACTS

Contract No. W-30-070-CWS-837 (NY 5-158 CCD) — 12 September 1944

Prime Contractor - Monsanto Chemical Company

Amount - $575,965.00

Amount Refunded by Monsanto - $230,631.41

Price per Pound - $0.36 for XXCC-3; $0.34 for CC-2

Pounds to be Produced - 339,825# XXCC-3; 1,334,200# CC-2

Date Started - 30 September 1944

Date Completed - 1 March 1945

Contract No. W-30-070-CWS-1219 (NY 5-898 CCD) — 12 April 1945

Prime Contractor - Monsanto Chemical Company

Amount - $142,200.00

Amount Refunded by Monsanto -

Price per Pound - $0.158

Pounds to be Produced - 900,000#

Date Started - 1 March 1945

Date Completed - Current

CC-2 OPERATING CONTRACTS

Contract No. W-266-CWS-266 — 17 September 1942

Prime Contractor - Monsanto Chemical Company

Amount - $1,100,000.00

Amount Refunded by Monsanto - $210,884.05

Price per Pound - $0.55 Standard - $0.45 Sub-Standard

Pounds to be Produced - 1,000 short tons

Supplemental Agreement No. 2 — 30 April 1943

Pounds to be Produced - 1,000 short tons (Total on contract 2,000 short tons)

Date Started - 8 October 1942

Date Completed - 21 September 1943

Contract No. W-49-057-CWS-4 — 11 September 1943
Later changed to Contract No. W-11-021-CWS-198

Prime Contractor - Monsanto Chemical Company

Amount - $598,000.00

Amount Refunded by Monsanto - $152,815.83

Price per Pound - $0.299 specification - $0.249 non-specification

Pounds to be Produced - 1,000 short tons

Date Started - 21 September 1943

Date Completed - 15 February 1944

CC-2 OPERATING CONTRACTS

Contract No. W-266-CWS-194 — 15 January 1942

Prime Contractor - Monsanto Chemical Company

Amount - $184,500.00

Amount Refunded by Monsanto - $72,844.43

Price per Pound - $1.05 Standard - $0.95 Sub-Standard

Pounds to be Produced - 150,000 lbs.

Supplementary Agreement No. 1 — 24 April 1942

Pounds to be Produced - 15,800 lbs. (Total on entire contract 165,800 lbs.)

Price per Pound - $0.95 Standard - $0.85 Sub-Standard

Date Started - 9 March 1942

Date Completed - 16 May 1942

Contract No. W-266-CWS-219 — 20 May 1942

Prime Contractor - Monsanto Chemical Company

Amount - $390,000.00

Amount Refunded by Monsanto - $147,886.66

Price per Pound - $0.65 Standard - $0.55 Sub-Standard

Pounds to be Produced - 600,000 lbs.

Date Started - 15 May 1942

Date Completed - 9 October 1942

CC-2 OPERATING CONTRACTS

Contract No. W-11-021-CWS-239 — 24 January 1944

Prime Contractor - Monsanto Chemical Company

Amount - $275,000.00

Amount Refunded by Monsanto - $154,359.25

Price per Pound - $0.35 Specification, $0.30 non-Specification

Pounds to be Produced - 375 short tons

Date Started - 16 February 1944

Date Completed - 29 May 1944

Contract No. W-11-021-cws-344 — 27 May 1944
(For Impregnite I, Micronized, XXCC-3)

Prime Contractor - Monsanto Chemical Company

Amount - $199,800.00

Amount Refunded by Monsanto - $108,762.57

Price per Pound - $0.36 in accordance with Specification 197-54-326A

Pounds to be Produced - 555,000#

Date Started - 1 June 1944

Date Completed - 29 September 1944

CC-2 Operating Contracts

Contract No. W-266-CWS-266 — 17 September 1942

Prime Contractor - Monsanto Chemical Company

Amount - $1,100,000.00

Amount Refunded by Monsanto - $210,884.05

Price per Pound - $0.55 Standard - $0.45 Sub-Standard

Pound to be Produced - 1,000 short tons

Date Started - 8 October 1942

Date Completed - 28 April 1943

Supplemental Agreement No. 2 — 30 April 1943

Pounds to be Produced - 1,000 short tons

Date Started - 28 April 1943

Date Completed - 21 September 1943

Contract No. W-49-057-CWS-4 — (Copy of Contract Available to this Office is not dated).

Prime Contractor - Monsanto Chemical Company

Amount - $598,000.00

Amount Refunded by Monsanto - (Contract not Complete)

Price per Pound - $0.299 specification - $0.249 non-specification

Pounds to be Produced - 1,000 short tons

Date Started - 21 September 1943

Date Completed - Current Contract

WAREHOUSES

Contract No. W-1103-eng-3722 — 18 April 1942

Warehouses No. 1 and 2. 15,968 sq. ft. in floor area.
Plans No. 7042-1 thru 7042-7.

Electric System
Overhead Distr. Lines, 170 lin. ft., 3-#6 wires. (Plan No. 7042-1).
Overhead Services, 2, 220/110 Volt Circuits. (Plan No. 7042-1).

Roads
Gravel, Stabilized, etc., 560 sq. yds., 4" macadam base, 2" chat surface. (Plan No. 7042-1).
Aprons, sq. yds., 491, concrete, 8" thick. (Plan No. 7042-1).

Prime Contractor - Esslinger-Misch Company

Original Estimate - $78,067

Cost - $69,686

Date Started - 29 April 1942

Date Completed - 31 July 1942

Date Accepted from Area Engineer - 31 July 1942

VENTILATING EQUIPMENT

Contract No. W-1103-eng-3688 — 9 May 1942

Prime Contractor - H. P. Faig Erecting Company

Original Estimate - $3500

Cost - $3323

Date Started - 9 May 1942

Date Completed - 31 August 1942

CC-2 EXPANSION

Contract No. W-1103-eng-3857 — 11 July 1942
(Architect-Engineer Services only)

Prime Contractor - Monsanto Chemical Company

Original Estimate - $1,354,665

Obligations to 9/25/43 - $1,055,775

Contract No. W-1103-eng-3938 — 25 August 1942
(Construction only)

Prime Contractor - Esslinger-Misch Company

Original Estimate - $1,329,500

Obligations to 9/25/43 - $1,197,348

Alterations and additions to existing plant and facilities.
Additional expansion covering construction and facilities.
Installation of a micronizer unit with necessary process piping.
New Machine Shop, addition of Laboratory, Foundation stabilization and general utilities.

Project Started - 26 August 1942

Entire Project Completed - 15 December 1943

Two additions and one building accepted from the Area Engineer on 12 June 1943

Laboratory Addition	-	3,500 sq. ft. in floor area
Change House Addition	-	7,200 " " " " "
Storeroom and Shop	-	18,000 " " " " "

Complete with facilities required. Additional facilities as part of the requirements to increase the capacity of this plant for the production of CC-2 from five tons per day to ten tons per day.

Supplement to W-1103-eng-3857 - Micronizer Unit
(Architect-Engineer Services only)

Supplement to W-1103-eng-3938 - Micronizer Unit
(Construction only)

Date Work Started - 15 December 1942 (W-1103-eng-3857)
27 February 1943 (W-1103-eng-3938)

Date Completed - 1 October 1943

Date Accepted from Area Engineer - 9 October 1943

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salary
9 March 1942 (Initial date of operations, Contract W-266-CWS-194)		
Operating	42	17
Maintenance	21	3
Office	0	9
Guards	9	1
	72	30
12 May 1942 (Contract W-266-CWS-194 completed and Supplemental Agreement No. 1 to Contract W-266-CWS-194 started)		
Operating	67	19
Maintenance	33	5
Office	0	11
Guards	21	1
	121	36
15 May 1942 (Supplemental Agreement No. 1, Contract W-266-CWS-194 completed, and Contract W-266-CWS-219 started)		
Operating	67	19
Maintenance	33	5
Office	0	11
Guards	21	1
	121	36
8 October 1942 (Contract W-266-CWS-219 completed, and Contract W-266-CWS-266 started)		
Operating	95	30
Maintenance	60	10
Office	0	19
Guards	26	1
	181	60
28 April 1943 (Contract W-266-CWS-266 completed, and Supplemental Agreement No. 2, Contract W-266-CWS-266 started)		
Operating	156	29
Maintenance	67	12
Office	0	21
Guards	30	1
	253	63
21 September 1943 (Supplemental Agreement No. 2, Contract W-266-CWS-266 completed, and Contract W-49-057-CWS-4 started)		
Operating	140	35
Maintenance	70	12
Office	0	21
Guards	27	1
	237	69

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

10 December 1943 (Includes Expansion	Hourly	Salary
Operating	180	43
Maintenance	76	12
Office	0	22
Guards	26	1
	282	78

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salaried
10 December 1943 (Contract W-11-021-CWS-198, includes expansion)		
Operating	180	43
Maintenance	76	12
Office	0	22
Guards	26	1
	282	78
16 February 1944 (Contract W-11-021-CWS-239 started)		
Operating	43	29
Maintenance	67	10
Office	0	20
Guards	25	1
	135	60
1 June 1944 (Contract W-11-021-cws-344 started)		
Operating	40	32
Maintenance	67	10
Office	0	21
Guards	12	1
	119	64
30 September 1944 (Contract W-30-070-CWS-837 started)		
Operating	55	16
Maintenance	70	9
Office	0	23
Guards	11	1
	136	49
1 March 1945 (Contract W-30-070-CWS-1219 started)		
Operating	49	15
Maintenance	72	9
Office	0	21
Guards	11	1
	132	46

PERSONNEL

CC-2 Plant
Chemical Warfare Service

1 February 1941 (Contract W-266-CWS-119 started)

Officer	0
Civilian	0

15 January 1942 (Contract W-266-CWS-119 completed)

Officer	3
Civilian	4

9 March 1942 (Initial date of operations, Contract W-266-CWS-194)

Officer	5
Civilian	11

29 April 1942 (Contract W-1103-eng-3722 started)

Officer	5
Civilian	12

9 May 1942 (Contract W-1103-eng-3688 started)

Officer	5
Civilian	12

15 May 1942 (Supplemental Agreement No. 1, Contract W-266-CWS-194 completed)

Officer	5
Civilian	12

31 July 1942 (Contract W-1103-eng-3722 completed)

Officer	4
Civilian	11

26 August 1942 (Contracts W-1103-eng-3857 and W-1103-eng-3938 started)

Officer	5
Civilian	15

31 August 1942 (Contract W-1103-eng-3688 completed)

Officer	5
Civilian	14

8 October 1942 (Contract W-266-CWS-219 completed and Contract W-266-CWS-266 started)

Officer	4
Civilian	15

28 April 1943 (Contract W-266-CWS-266 completed and Supplemental Agreement No. 2, Contract W-266-CWS-266 started)

Officer	4
Civilian	14

PERSONNEL

CC-2 Plant
Chemical Warfare Service

21 September 1943 (Supplemental Agreement No. 2, Contract W-266-CWS-266 completed, and Contract W-49-057-CWS-4 started)

Officer	4
Civilian	15

15 December 1943 (Current Contract W-49-057-CWS-4)

Officer	3
Civilian	14

PERSONNEL

CC-2 Plant
Chemical Warfare Service

21 September 1943 (Contract W-11-021-CWS-198 started)

Officer	4
Civilian	
Industrial Division	11
Inspection Division	4

16 February 1944 (Contract W-11-021-CWS-239 started)

Officer	3
Civilian	
Industrial Division	9
Inspection Division	4

1 June 1944 (Contract W-11-021-CWS-344 started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	4

30 September 1944 (Contract W-30-070-CWS-837, P.O. NY 5-158 CCD started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	3

1 March 1945 (Contract W-30-070-CWS-1219, P.O. NY 5-898 CCD started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	3

PERSONNEL

CC-2 Plant
Area Engineer and Outside Contractors

Contract W-266-CWS-119 (Peak of construction)

Area Engineer	36
Outside Contractors	370

Contract W-1103-eng-3722 (Peak of construction)

Area Engineer	4
Outside Contractors	140

Contract W-1103-eng-3688 (Peak of construction)

Area Engineer	none
Outside Contractors	3

Contract W-1103-eng-3938, including Supplement (Peak of construction)

Area Engineer	24
Outside Contractors	400

EXPENDITURES AND ALLOTMENTS

CC-2 Plant

			Allotments
CWS 374 P 9-99 A1105-23	For general purposes in connection with CC-2 contracts with Monsanto Chemical Company		$93,571.92
	Expended F.Y. 1942 - 1943	$91,160.62	
	" F.Y. 1943 - 1944 to date	208.81	
		91,369.43	
CWS 981 P1-99 A0141-03	For general purposes in connection with funds for construction at Monsanto.		74,083.06
	Expended F.Y. 1941 - 1942	$34,774.70	
	" F.Y. 1942 - 1943	39,308.36	
		$74,083.06	
CWS 3488 P120-99 A1105-23	For General purposes in connection with Procurement Order 2037-42		2,630,000.00
	Expended F.Y. 1942 - 1943	$1,697,809.53	
	" F.Y. 1943 - 1944	832,681.03	
		2,530,490.56	
*CWS 24310 P310-99 A1105-23	For general purposes in connection with administrative expense, salaries, etc.		15,000.00
	Expended F.Y. 1942 - 1943	$13,425.46	
	" F.Y. 1943 - 1944	216.20	
		13,641.66	
CWS 424312 P310-99 A1105-24	For Current expenses to maintain plant in standby condition		50,000.00
	Expended F.Y. 1943 - 1944	$15,803.48	

*This includes overhead for DAT Plant which cannot be separately determined. For purposes of cost reports, 25% has been charged as DAT's portion of overhead expenses.

CC-2 PLANT

EXPENDITURES AND ALLOTMENTS

1944 - 1945

504-2431 P310-99 A 212/51105

	Allotment	Obligations	Expenditures
July 1944	$24,000.00	$ 2,010.00	$ 1,002.70
Aug.		3,509.23	3,420.15
Sept.	24,000.00	3,685.94	3,595.13
Oct.		18,108.59	18,052.40
Nov.		18,758.00	18,211.42
Dec.		1,300.65	2,231.81
Jan. 1945	24,000.00	17,589.94	17,703.46
Feb.		3,996.17	3,908.23
Mar.		2,620.00	2,629.12
	$72,000.00	$71,578.52	$70,754.42

504-2412 P120-99 A 212/51105

	Allotment	Obligations	Expenditures
July 1944		$ 55.64	$ 48.22
Aug.		4,428.10	4,426.59
Sept.		9,292.88	8,699.71
Oct.			
Nov.		448,36	2.00
Dec.		13,163.39	13,712.77
Jan. 1945		1.06	67.78
Feb.		15,127.83	15,263.08
Mar.		6,232.93	6,231.77
		$48,748.07	$48,451.92

These figures exclusive of Monsanto contracts for material and reimbursements made under said contracts.

No specific allotment under 504-2412 was furnished this office, and therefore is not shown inasmuch as this is a general manufacturing account.

MONTHLY PRODUCTION CC-2

1942			
April	90,473	lbs.	(27 March - 31 April 1942 inclusive)
May	115,755	"	(Contract W-266-CWS-194 completed 16 May 1942
June	114,185	"	(165,800# accepted and shipped
July	87,731	"	
August	131,772	"	
September	182,215	"	
October	247,528	"	(Contract W-266-CWS-219 completed 9 October 1942
November	298,889	"	(603,000# accepted and shipped
December	287,639	"	
1943			
January	300,580	lbs.	
February	259,967	"	
March	364,611	"	
April	365,372	"	
May	400,067	"	
June	406,383	"	
July	431,040	"	
August	446,500	"	
September	446,500	"	(Contract W-266-CWS-266 completed 21 September 1943
October	483,200	"	(4,001,500# accepted and shipped
November	473,135	"	
December	621,414	"	
1944			
January	197,117	lbs.	
February	169,272	"	(Contract W-11-021-CWS-198 completed 15 February 19
March	311,222	"	(1,420,295# CC-2 as such accepted and shipped
April	244,500	"	(579,704# CC-2 contained in XXCC-3 accepted
May	180,777	"	(and shipped
June	174,046	"	(638,755# XXCC-3 accepted and shipped
July	187,628	"	
August	171,951	"	(Contract W-11-021-CWS-239 completed 29 May 1944
September	250,799	"	(520,950# CC-2 as such accepted and shipped
October	245,600	"	(285,030# CC-2 contained in XXCC-3 accepted
November	336,197	"	(and shipped
December	216,125	"	(313,425# XXCC-3 accepted and shipped
1945			(Contract W-11-021-CWS-344 completed 29 September 1
			(579,375# XXCC-3 accepted and shipped
January	297,287	lbs.	(526,951# CC-2 contained in XXCC-3 accepted and
February	275,833	"	(shipped
March	329,948	"	
April	327,535	"	(Contract W-30-070-CWS-837 completed 1 March 1945
			(1,342,800# CC-2 as such accepted and shipped
			(309,044# CC-2 contained in XXCC-3 accepted and
			(shipped
			(339,825# XXCC-3 accepted and shipped

S-330 PLANT

Manufacturing Superintendent of the S-330 Plant is Mr. J. F. Stickley, and Department Superintendent is Mr. E. E. Poenack for the Monsanto Chemical Company.

Major J. T. Baughman, who reported to this station for duty 26 August 1943, is the Commanding Officer and Contracting Officer's representative for this plant.

Weekly Works Letters, Weekly Operations Reports and Monthly Operations Reports from April 1944 to current date, covering operations, development work, labor and personnel, production and raw material consumption are available at the following offices:

Office of Chief, Chemical Warfare Service, Industrial Division, Mfg. and Proc. Branch, Washington, D. C.

Office of Chief, Chemical Warfare Service, Technical Division, Edgewood Arsenal, Maryland

Office of Chief, Chemical Warfare Service, Industrial Liaison Branch, Edgewood Arsenal, Maryland

Complete set of specifications and blueprints, showing location, layout and details of equipment is available at the following offices:

Office of Chief, Chemical Warfare Service, Industrial Division, Facilities and Requirements Branch, Washington, D. C.

Office of Chief, Chemical Warfare Service, Technical Division, Edgewood Arsenal, Maryland

Production schedules for the S-330 Plant varied from a start of approximately 21,000# in April 1944, to a peak of approximately 200,000# in November 1944. Schedules were then reduced to 75,000# per month in February 1945. On 17 May 1945 directions were received to terminate the contract by working out all stocks then in process, and closing down the plant.

S-330 PLANT

Operating Contract

Contract No. W-18-035-CWS-265 13 December 1943

Pilot Plant Research Contract with the Technical Division for production of S-330 for Chemical Warfare Service experimental purposes.

Prime Contractor - Monsanto Chemical Company

Amount - $50,644.44

Date Started - 3 March 1944

Date Completed - 26 May 1944

Total Produced - 35,760#

Supplemental Agreement No. 1 5 April 1944

Amount Increased $10,000.00

Total amount due under contract - $60,644.44

Contract extended up to and including 5 July 1944, to obtain additional information and data on product S-330.

S-330 PLANT

Operating Contract

Contract No. W-11-021-CWS-290 — 4 April 1944

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $213,720.00 (estimated)

Reduced to $210,576.25 (estimated) Supplemental Agreement No. 1
" " $194,616.25 (estimated) " " No. 2
Changed " $257,751.53 (estimated) " " No. 3

Pounds to be produced - 156,000#

Queeny Plant - 36,000#

Interim Plant - (CWS DAT Plant) 120,000#
Increased to 180,000# by Supplemental Agreement No. 3

Price per Pound

Queeny Plant - $1.87 per pound for specification
$1.77 per " " non-specification

$1.76 " " " specification) Supplemental Agree-
$1.66 " " " non-specification) ment No. 2

Interim Plant - $1.22 per pound for specification
$1.12 " " " non-specification

$1.12 " " " specification) Supplemental Agree-
$1.02 " " " non-specification) ment No. 2

Date Started - 1 May 1944

Date Completed - 18 August 1944

Total Accepted - 184,825# (Interim Plant)
36,300# (Queeny Plant)
221,125# Total both plants

S-330 PLANT

Operating Contracts

Contract No. W-11-021-cws-363 — 31 July 1944

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - Not to exceed $497,993.75

Pounds to be produced - 585,875#

Price per pound - $0.85 for specification
$0.80 for non-specification

Date Started - 6 September 1944

Date Completed - 4 December 1944

Contract No. W-30-070-CWS-1081 (NY 5-544 CCD) — 13 December 1944

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $133,008.00

Pounds to be produced - 510,000#

Price per pound - $.2608

Date Started - 1 December 1944

Date Completed - 23 February 1945

S-330 PLANT

Construction Contract

Contract W-49-018-ENG-5 — 2 January 1944

S-330 Design and Engineering Contract, adapting as much of the equipment in the DAT Plant as is practicable for Pilot Plant research on Steps 3 and 4 to produce S-330 on the site of the DAT Plant.

Prime Contractor - Monsanto Chemical Company

Amount - $25,000.00

Sub-Contractors

T. L. and Nelson Cunliff Construction Company
Started work - 9 December 1943
Completed work - 8 January 1944

Midwest Piping and Supply Company
Started work - 10 December 1943
Completed work - 7 January 1944

Lowry Electric Company
Started work - 22 December 1944
Completed work - 6 January 1944

S-330 PLANT

Contract No. W-49-057-CMS-d — 24 February 1944

Construction of plant for Interim Production

Alternation and rehabilitation of equipment in CC-2 plant necessary for the interim production of S-330, by converting product of Step 3A into S-330 at approximate rate of 2,000# per twenty-four hour day.

Furnishing, assembling and installation (in a portion of the DAT Plant) of all necessary equipment required for a pilot plant for Step 3A production of S-330 at approximate rate of 2,000# per twenty-four hour day.

Prime Contractor - Monsanto Chemical Company

Amount - $34,000.00

Sub-Contractors

W. H. and Nelson Sunliff Construction Company
Started work - 15 March 1944
Completed work - 21 April 1944

Midwest Piping and Supply Company
Started work - 13 March 1944
Completed work - 12 April 1944

Lowry Electric Company
Started work - 21 March 1944
Completed work - 5 April 1944

Monsanto Chemical Company, Plant "B", Monsanto, Illinois
Started work - 28 February 1944
Completed work - 24 March 1944

S-330 PLANT

Contract No. W-23-065-Eng-319 — 14 February 1944

Construction contract for the conversion of CAT Plant to the manufacture of product S-330, consisting principally of -

Step 3-A
This includes all necessary equipment, piping, valves, controls, electric, concrete and steel supports and platforms.
Completed and accepted 21 July 1944

L-1 System
This includes all necessary equipment, piping, electric and controls.
Completed and accepted 24 July 1944

Step 3-B
This includes all necessary equipment, piping, valves, electric, controls, concrete and structural steel foundations and supports.
Completed and accepted 7 August 1944

Step 4
This includes all necessary equipment, piping, valves, controls, electric, concrete, foundations and structural steel.
Completed and accepted 7 August 1944

Milling, sifting and packing
This includes concrete structural steel, platforms and steps, also jigger screen, starter rack number 6 with controls and electric lighting.
Completed and accepted 1 August 1944

Concrete steel structure supports and platforms
L-1 recovery, including control house, unloading platform, concrete foundations, structural steel, platforms, stairs, walkways, and cooling tower.
Completed and accepted 24 July 1944

Utility Systems
Water System
Water Service Lines, 253 lin. ft.
Sewer System
Sanitary Sewer Mains, 479 lin. ft.
Electric System
Underground Services - 2
Exterior Lighting System, 25 lights
Completed and accepted 18 July 1944

31[illegible] (Continued) 14 February 1944

[illegible]nes, 378 lineal feet
[illegible]lineal feet
[illegible]lineal feet

[illegible]etc., 395 square yards

[illegible]5 July 1944

S-330 PLANT

Operating Contracts

Contract No. W-30-070-CWS-1218 (NY 5-897 CCD) — 20 April 1945

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $120,000.00

Pounds to be produced - 300,000#

Price per pound - $.40

Date Started - 1 March 1945

Date Completed - Current

DAT PLANT

Manufacturing Superintendent of the DAT Plant was Mr. Joseph F. Stickley. Production Supervisor was Mr. A. G. Mauterer.

Captain Leo J. Hardin reported for duty at the St. Louis Plant, C.W.S. on 22 December 1941, and was assigned to the DAT Plant. Captain Hardin was transferred to the Chicago Chemical Warfare Procurement District on 10 May 1943. At the present time he is on duty at Camp Detrick, Frederick, Maryland.

On 5 January 1942, Major Willard L. Finley assumed duties at St. Louis Plant, C.W.S., as Commanding Officer. Major Finley was transferred from this station 10 August 1942. He is on duty with the Army Air Force, Army Air Force Depot, Gadsden, Alabama, at the present time.

Lt. Colonel Frank R. Johnson reported to this station as Commanding Officer 8 August 1942, and was transferred to the Office of the Chief, Chemical Warfare Service, Washington, D. C., 12 April 1943 where he is on duty at the present time.

Captain Raymond J. Schadt assumed command of this plant 7 April 1943 and was transferred to the Chicago Chemical Warfare Procurement District, 4 October 1943.

Major Jim T. Baughman reported to this plant as Commanding Officer 26 August 1943, and is on duty here at the present time.

The Plant was specially built to make one product — DAT — for the Chemical Warfare Service. Manufacture of DAT has been discontinued by order of the Office of Chief, Chemical Warfare Service. Until closed down on 2 November 1943, it was operating very closely to the original operating plans. It is contemplated to rehabilitate the existing plant in order that a new product, designated as S-330, can be made there.

Complete set of specifications and drawings, showing location, layout and details of equipment, is available at Office of Chief, Chemical Warfare Service, Construction Division, Washington, D. C.

Monthly production figures of DAT for the period August 1942 to November 1943, are as shown on attached sheet.

Expenditures and allotments by fiscal years are indicated on attached sheet.

Chemical Warfare Service, Monsanto, Area Engineer and construction personnel were as shown on the attached sheets.

ORIGINAL DAT PLANT

Contract No. DA-W-266-CWS-1 27 August 1941

St. Louis Plant, C.W.S., Unit No. 2 10,400 sq. ft. in floor area, designed to produce 240 tons of DAT per annum. (Plans No. A-1 thru A-9)

Water System
- Water mains 378 lin. ft., cast iron, oakum-lead joints (Plan No. W-1)
- Water Service Lines 575 " " " " " " " (Plan No. P-1)

Sewer System
- Sanitary Sewer Mains 413 lin. ft. vitrified tile (Plan No. P-1)
- Storm Sewer Lines 415 " " farm and vitrified tile (Plan No. A-2)

Electric System
- Underground Distr. Lines, 700 lin. ft., Koreduct, concrete encased. (Plan No. EL-1)
- Underground Services, 1, 3 phase, 440 volts, 500 MCM. (Plan No. EL-1)
- Ext. Lighting System, 8 lights, 200 watt lamps. (Plan No. EL-1)
- Distr. Line Transformers, 30 KVA, three, 10 KVA, 440/220-110 volts, air cooled, wall mounted. (Plan No. EL-2)

Central Heating Plant
- Distribution Lines, 377 lin. ft., seamless steel pipe (Plan No. H-1)

Roads
- Concrete, 1725 sq. yds., reinforced, 20' wide, 8" thick (Plan No. A-10)

Railroads
- Trackage, .047 miles, Standard gauge, 100# rail. (Plan No. A-2)

Other Post Areas, 2.22 (Approx.) Additional site grounds. (Plan No. A-1)

Prime Contractor - Monsanto Chemical Company

Original Estimate - $449,021

Cost - $444,534

Date Started - 23 December 1941

Date Completed - 31 July 1942

Date Accepted from Area Engineer - 31 July 1942

ADDITION TO DAT PLANT

Contract No. DA-W-CWS-1 Supplement B 24 July 1942

An addition, comprising approximately 5,000 sq. ft. of floor space, made to the existing plant, in which there was installed manufacturing machinery and equipment capable of producing 80,000 pounds of DAT per month.

Service building comprising approximately 5,500 sq. ft. of floor area.

Prime Contractor - Monsanto Chemical Company

Original Estimate - $373,610

Expended to 9/25/43 - $260,318

Date Started - 17 August 1942

Date Completed - 31 May 1943

Date Accepted from Area Engineer - 15 July 1943

DAT OPERATING CONTRACTS

Contract No. W-266-CWS-227 — 29 June 1942

For the production of DAT

Primary Contractor - Monsanto Chemical Company

Amount - $144,000

Amount Refunded by Monsanto - $52,247.56

Price per Pound - $.30

Pounds to be Produced - 480,000 lbs.

Date Started - 1 August 1942

Date Completed - 12 February 1943

Contract No. W-799-CWS-827 — 28 January 1943

For the production of DAT

Primary Contractor - Monsanto Chemical Company

Amount - $330,000

Amount Refunded by Monsanto - Refund negotiations not yet completed by Monsanto Chemical Company

Price per Pound - $.22
$.219 (Per Supplemental No. 1 to above contract)

Pounds to be Produced - 1,500,000 lbs.

Date Started - 12 February 1943

Date Completed - Plant Shutdown 2 November 1943
755,382 lbs. produced as of that date

MONTHLY PRODUCTION FIGURES - DAT

1942

August	43,578 pounds
September	69,064 pounds
October	78,530 pounds
November	85,139 pounds
December	86,017 pounds

1943

January	80,090 pounds
February	96,827 pounds *
March	113,182 pounds
April	40,852 pounds
May	76,560 pounds
June	89,425 pounds
July	93,752 pounds
August	95,662 pounds
September	87,669 pounds
October	91,464 pounds
November	7,571 pounds

755,382 pounds produced on Contract W-799-CWS-827 (not completed)

Total produced 1,235,382 pounds

Shipped, as of 10 December 1943, 1,091,593 pounds

On hand, as of 10 December 1943, 143,789 pounds

*12 February 1943, Contract W-266-CWS-227 completed

EXPENDITURES AND ALLOTMENTS

DAT Plant

		Allotments
CWS 3381 P120-99 A1105-23		$151,205.90
	Expended F.Y. 1943	151,205.90
CWS 8254 P121-99 A1105-23		11,342.92
	Expended F.Y. 1943	11,342.92
CWS 24121 P121-99 A1105-23		284,033.29
	Expended F.Y. 1943	284,033.29
4-424120 P120 -99 A212/41105		1,719.86
	Expended F.Y. 1944	1,719.86
CWS 3488 P120 -99 A1105-23		2,630,000.00
	Expended F.Y. 1943 (balance for CC-2 plant)	4,888.57

Administrative and overhead costs for DAT are not included here, but are shown with expenditures for CC-2 Plant. An arbitrary figure of 25% has been charged to the DAT Plant in cost reports.

PERSONNEL

DAT Plant
Monsanto Chemical Company

	Hourly	Salary
1 August 1942 (Initial date of operations, Contract W-266-CWS-227)		
Operating	8	5
Maintenance	0	0
Office	0	1
12 February 1943 (Contract W-266-CWS-227 completed, and Contract W-799-CWS-827 started)		
Operating	28	6
Maintenance	1	0
Office	0	1
2 November 1943 (Plant shutdown)		
Operating	10	4
Maintenance	1	0
Office	0	0

Area Engineer and Outside Contractors

Contract DA-W-266-CWS-1 (Peak of construction)	
Area Engineer	28
Outside Contractors	180
Contract DA-W-266-CWS-1, Supplement B (Peak of construction)	
Area Engineer	10
Outside Contractors	110

Chemical Warfare Service

One C.W.S. officer and one C.W.S. civilian assigned to the DAT Plant.

CC-2 PLANT

Manufacturing Superintendent of the CC-2 Plant is Mr. J. F. Stickley. Production Superintendent is Mr. E. W. Mares.

Major George F. Russell reported for duty at the St. Louis Plant, Chemical Warfare Service, to act as Plant Representative for the Chemical Warfare Service, on 16 June 1941. Major Russell departed from this plant 13 June 1942. At the present time Major Russell is on duty with the Corps of Engineers in New York, New York.

On 5 January 1942, Major Willard L. Finley assumed duties at St. Louis Plant, Chemical Warfare Service, as Commanding Officer. Major Finley was transferred from this station 10 August 1942. Major Finley is on duty with the Army Air Force, Army Air Force Depot, Gadsden, Alabama, at the present time.

Captain David W. Dick reported for duty at St. Louis Plant, C.W.S., and was assigned duties as Property Officer on 16 January 1942. Captain Dick was transferred to Edgewood Arsenal, Maryland 3 September 1942, and is on duty at Camp Sibert, Gadsden, Alabama at present.

Captain William J. Snoddy reported to the St. Louis Plant, C.W.S., 2 February 1942, and was transferred to Edgewood Arsenal, Maryland, 27 June 1942, and is on duty in the Hawaiian Islands at the present time.

Captain Daniel J. Pflaum reported to this plant 26 June 1942, and assumed the duties of Executive Officer. Captain Pflaum was transferred to Edgewood Arsenal, Maryland, 8 April 1943. At the present time Captain Pflaum is on duty with the Corps of Engineers, New York, New York.

Lieutenant Colonel Frank R. Johnson reported to this station as Commanding Officer 3 August 1942, and was transferred to the Office of Chief, Chemical Warfare Service, Washington, D. C., 12 April 1943, where he is on duty at present.

Lt. Eugene E. Nattie reported to the St. Louis Plant, C.W.S., 26 August 1942 to assume the duties of Property Officer. Lt. Nattie left this station 31 August 1943, and is on duty at the present time in the Office of Chief, Chemical Warfare Service, Washington, D. C.

Privates Jack Baxter and LeRoy Cook, Jr. reported to this station for duty as draftsmen 21 September 1942, from the Replacement Training Center, Camp Sibert, Gadsden, Alabama.

Sergeant Andrew D. Forsythe reported for duty at this station 17 November 1942 from Edgewood Arsenal, Maryland. Sergeant Forsythe left this station 3 December 1942 in order to attend OC Course Class at Fort Belvoir, Virginia.

Privates Cook and Baxter were recommended for Good Conduct Medals on 1 November 1943; recommendation was approved 3 November 1943 and award was made on 27 November 1943.

Privates Baxter and Cook left this station 27 November 1943, in order to attend non-commissioned officers gas course at Edgewood Arsenal, Maryland.

Captain Raymond J. Schadt assumed command of this plant 7 April 1943, and was transferred to the Chicago Chemical Warfare Procurement District 4 October 1943. He has now returned to civilian life.

Captain Edwin D. Wilson reported to this station 17 April 1943, and assumed the duties of Executive Officer. Captain Wilson departed from this station 5 April 1944 for Camp Sibert, Alabama.

Lieutenant Charles B. Lansdell arrived at this plant 4 June 1943 to assume the duties of Property Officer, and is on duty at this plant at the present time.

Major Jim T. Baughman reported to this plant as Commanding Officer 26 August 1943, and is Commanding Officer at this plant at the present time.

The CC-2 Plant, designed to produce five tons of CC-2 per day, was accepted from the Area Engineer on 16 January 1942, and went into operation 9 March 1942. On 15 April 1942 the first shipment of CC-2 was made from this plant. Work was started to construct additional facilities to increase the capacity of this plant from five tons of CC-2 per day to ten tons of CC-2 per day on 26 August 1943.

On 14 November 1942 this office was notified that it had been awarded the Army Navy "E". Presentation ceremonies were held 5 January 1943 at the Monsanto Chemical Company, Monsanto, Illinois. This plant was awarded the White Star on 24 December 1943, a Second White Star on 24 June 1944, and a Third White Star on 10 February 1945.

In June 1943 the St. Louis Plant, C.W.S., won the President's Safety Trophy for the first and second quarters of 1943; operating 183 days without a lost time accident. During the second quarter of 1944, this plant flew the green safety flag of Monsanto, indicating the lowest accident rate of all Monsanto plants for that quarter. A total of 305 days elapsed before the next lost time accident on 5 November 1944. There has now been 198 days (through 23 May 1945) since last lost time accident.

Production of micronized material was begun 10 October 1943. The last batch of micronized material was accepted on 28 October 1944.

ORIGINAL DC-2 PLANT

Contract No. W-266-CWS-119 4 November 1940

St. Louis Plant, C.W.S., Unit No. 1., consisting principally of -
Manufacturing Building
Lime Plant
Storage Tanks
Pump House and three deep well pumps
Change House and shop
Garage and Fire House
Office and Laboratory Building
Electric Substation
Gate House
Storage Shed
Railroads with track scales
Car spots
Fire hydrant houses
Incinerator
Necessary water, steam, sewage, electric and gas supply systems

Prime Contractor - Monsanto Chemical Company

Original Estimate - $2,444,480

Cost - $2,157,012

Date Started - 1 February 1941

Date Completed - 15 January 1942

Date Accepted from Area Engineer - 15 January 1942

ANNEX B

Contract No. [illegible]-1103-ans-3722 13 April 1942

Warehouses No. 1 and 2. 15,968 sq. ft. in floor area.
Plans No. 7042-1 thru 7042-7.

Electric System
Overhead Distr. Lines, 170 lin. ft., 3-#6 wires. (Plan No. 7042-1).
Overhead Services, 2, 220/110 Volt Circuits. (Plan No. 7042-1).

Roads
Gravel, Stabilized, etc., 560 sq. yds., 4" macadam base, 2" chat surface. (Plan No. 7042-1).
Aprons, sq. yds., 491, concrete, 8" thick. (Plan No. 7042-1).

Prime Contractor - Esslinger-Misch Company

Original Estimate - $78,067

Cost - $69,686

Date Started - 29 April 1942

Date Completed - 31 July 1942

Date Accepted from Area Engineer - 31 July 1942

VENTILATING EQUIPMENT

Contract No. W-1103-eng-3688 — 9 May 1942

Prime Contractor - H. K. Paig Erecting Company

Original Estimate - $3500

Cost - $3323

Date Started - 9 May 1942

Date Completed - 31 August 1942

DC-2 EXPANSION

Contract No. W-1103-eng-3857 — 11 July 1942
(Architect-Engineer Services only)

Prime Contractor - Monsanto Chemical Company

Original Estimate - $1,354,665

Obligations to 9/25/43 - $1,055,775

Contract No. W-1103-eng-3938 — 25 August 1942
(Construction only)

Prime Contractor - Zaslinger-Misch Company

Original Estimate - $1,329,500

Obligations to 9/25/43 - $1,197,348

Alterations and additions to existing plant and facilities. Additional expansion covering construction and facilities. Installation of a micronizer unit with necessary process piping. New Machine Shop, addition of Laboratory, Foundation stabilization and general utilities.

Project Started - 26 August 1942

Entire Project Completed - 15 December 1943

Two additions and one building accepted from the Area Engineer on 17 June 1943
Laboratory Addition - 3,500 sq. ft. in floor area
Change House Addition - 7,200 " " " " "
Storeroom and Shop - 18,000 " " " " "
Complete with facilities required. Additional facilities as part of the requirements to increase the capacity of this plant for the production of DC-2 from five tons per day to ten tons per day.

Supplement to W-1103-eng-3857 - Micronizer Unit
(Architect-Engineer Services only)

Supplement to W-1103-eng-3938 - Micronizer Unit
(Construction only)

Date Work Started - 15 December 1942 (W-1103-eng-3857)
27 February 1943 (W-1103-eng-3938)

Date Completed - 1 October 1943

Date Accepted from Area Engineer - 5 October 1943

CC-2 OPERATING CONTRACTS

Contract No. W-266-CWS-194 — **15 January 1942**

Prime Contractor - Monsanto Chemical Company

Amount - $184,500.00

Amount Refunded by Monsanto - $72,884.43

Price per Pound - $1.05 Standard - $0.95 Sub-Standard

Pounds to be Produced - 150,000 lbs.

Supplementary Agreement No. 1 — **24 April 1942**

Pounds to be Produced - 15,800 lbs. (Total on entire contract 165,800 lbs.)

Price per Pound - $0.95 Standard - $0.85 Sub-Standard

Date Started - 9 March 1942

Date Completed - 16 May 1942

Contract No. W-266-CWS-219 — **20 May 1942**

Prime Contractor - Monsanto Chemical Company

Amount - $390,000.00

Amount Refunded by Monsanto - $147,886.66

Price per Pound - $0.65 Standard - $0.55 Sub-Standard

Pounds to be Produced - 600,000 lbs.

Date Started - 15 May 1942

Date Completed - 9 October 1942

CC-2 OPERATING CONTRACTS

Contract No. W-266-CWS-266 — 17 September 1942

Prime Contractor - Monsanto Chemical Company

Amount - $1,100,000.00

Amount Refunded by Monsanto - $210,884.05

Price per Pound - $0.55 Standard - $0.45 Sub-Standard

Pounds to be Produced - 1,000 short tons

Supplemental Agreement No. 2 — 30 April 1943

Pounds to be Produced - 1,000 short tons (Total on contract 2,000 short tons)

Date Started - 8 October 1942

Date Completed - 21 September 1943

[illegible]ract No. W-49-057-CWS-4 — 11 September 1943
[illegible]r changed to Contract No. W-11-021-CWS-198

[illegible]e Contractor - Monsanto Chemical Company

[illegible]t - $598,000.00

[illegible]nt Refunded by Monsanto - $152,815.83

[illegible]e per Pound - $0.299 specification - $0.249 non-specification

[illegible]ds to be Produced - 1,000 short tons

[illegible] Started - 21 September 1943

[illegible]ompleted - 15 February 1944

CC-2 OPERATING CONTRACTS

Contract No. W-11-021-CMS-239 — **24 January 1944**

Prime Contractor - Monsanto Chemical Company

Amount - $275,000.00

Amount Refunded by Monsanto - $154,359.25

Price per Pound - $0.35 Specification, $0.30 non-Specification

Pounds to be Produced - 375 short tons

Date Started - 16 February 1944

Date Completed - 29 May 1944

Contract No. W-11-021-cms-344 — **27 May 1944**
(For Impregnite I, Micronized, IXCC-3)

Prime Contractor - Monsanto Chemical Company

Amount - $199,800.00

Amount Refunded by Monsanto - $108,762.57

Price per Pound - $0.36 in accordance with Specification 197-54-326A

Pounds to be Produced - 555,000#

Date Started - 1 June 1944

Date Completed - 29 September 1944

CC-2 OPERATING CONTRACTS

Contract No. W-30-070-CWS-837 (NY 5-158 CCD) — 12 September 1944

Prime Contractor - Monsanto Chemical Company

Amount - $575,965.00

Amount Refunded by Monsanto - $230,631.41

Price per Pound - $0.36 for XXCC-3; $0.34 for CC-2

Pounds to be Produced - 339,825# XXCC-3; 1,334,200# CC-2

Date Started - 30 September 1944

Date Completed - 1 March 1945

Contract No. W-30-070-CWS-1219 (NY 5-898 CCD) — 12 April 1945

Prime Contractor - Monsanto Chemical Company

Amount - $142,200.00

Amount Refunded by Monsanto -

Price per Pound - $0.158

Pounds to be Produced - 900,000#

Date Started - 1 March 1945

Date Completed - Current

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salary
9 March 1942 (Initial date of operations, Contract W-266-CWS-194)		
Operating	42	17
Maintenance	21	3
Office	0	9
Guards	9	1
	72	30
12 May 1942 (Contract W-266-CWS-194 completed and Supplemental Agreement No. 1 to Contract W-266-CWS-194 started)		
Operating	67	19
Maintenance	33	5
Office	0	11
Guards	21	1
	121	36
15 May 1942 (Supplemental Agreement No. 1, Contract W-266-CWS-194 completed, and Contract W-266-CWS-219 started)		
Operating	67	19
Maintenance	33	5
Office	0	11
Guards	21	1
	121	36
8 October 1942 (Contract W-266-CWS-219 completed, and Contract W-266-CWS-266 started)		
Operating	95	30
Maintenance	60	10
Office	0	19
Guards	26	1
	181	60
28 April 1943 (Contract W-266-CWS-266 completed, and Supplemental Agreement No. 2, Contract W-266-CWS-266 started)		
Operating	156	29
Maintenance	67	12
Office	0	21
Guards	30	1
	253	63
21 September 1943 (Supplemental Agreement No. 2, Contract W-266-CWS-266 completed, and Contract W-49-057-CWS-4 started)		
Operating	146	35
Maintenance	70	12
Office	0	21
Guards	27	1
	237	69

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salary
10 December 1943 (Includes Expansion	180	43
Operating	76	12
Maintenance	0	22
Office	26	1
Guards	282	78

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salary
10 December 1943 (Includes Expansion	180	43
Operating	76	12
Maintenance	0	22
Office	26	1
Guards	282	78

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salary
10 December 1943 (Includes Expansion	180	43
Operating	76	12
Maintenance	0	22
Office	26	1
Guards	282	78

PERSONNEL

CC-2 Plant
Monsanto Chemical Company

	Hourly	Salaried
10 December 1943 (Contract W-11-021-CWS-198, includes expansion)		
Operating	130	43
Maintenance	76	12
Office	0	22
Guards	26	1
	282	78
16 February 1944 (Contract W-11-021-CWS-239 started)		
Operating	43	29
Maintenance	67	10
Office	0	20
Guards	25	1
	135	60
1 June 1944 (Contract W-11-021-cws-344 started)		
Operating	40	32
Maintenance	67	10
Office	0	21
Guards	12	1
	119	64
30 September 1944 (Contract W-30-070-CWS-837 started)		
Operating	55	16
Maintenance	70	9
Office	0	23
Guards	11	1
	136	49
1 March 1945 (Contract W-30-070-CWS-1219 started)		
Operating	49	15
Maintenance	72	9
Office	0	21
Guards	11	1
	132	46

PERSONNEL

CC-2 Plant
Chemical Warfare Service

1 February 1941 (Contract W-266-CWS-119 started)
Officer 0
Civilian 0

15 January 1942 (Contract W-266-CWS-119 completed)
Officer 3
Civilian 4

9 March 1942 (Initial date of operations, Contract W-266-CWS-194)
Officer 5
Civilian 11

29 April 1942 (Contract W-1103-eng-3722 started)
Officer 5
Civilian 12

9 May 1942 (Contract W-1103-eng-3688 started)
Officer 5
Civilian 12

15 May 1942 (Supplemental Agreement No. 1, Contract W-266-CWS-194 completed)
Officer 5
Civilian 12

31 July 1942 (Contract W-1103-eng-3722 completed)
Officer 4
Civilian 11

26 August 1942 (Contracts W-1103-eng-3857 and W-1103-eng-3938 started)
Officer 5
Civilian 15

31 August 1942 (Contract W-1103-eng-3688 completed)
Officer 5
Civilian 14

5 October 1942 (Contract W-266-CWS-219 completed and Contract W-266-CWS-266 started)
Officer 4
Civilian 15

23 April 1943 (Contract W-266-CWS-266 completed and Supplemental Agreement No. 2, Contract W-266-CWS-266 started)
Officer 4
Civilian 14

PERSONNEL

CC-2 Plant
Chemical Warfare Service

21 September 1943 (Supplemental Agreement No. 2, Contract W-266-CWS-266 completed, and Contract W-49-057-CWS-4 started)

Officer	4
Civilian	15

15 December 1943 (Current Contract W-49-057-CWS-4)

Officer	3
Civilian	14

PERSONNEL

CC-2 Plant
Chemical Warfare Service

21 September 1943 (Contract W-11-021-CWS-198 started)

Officer	4
Civilian	
Industrial Division	11
Inspection Division	4

16 February 1944 (Contract W-11-021-CWS-239 started)

Officer	3
Civilian	
Industrial Division	9
Inspection Division	4

1 June 1944 (Contract W-11-021-CWS-344 started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	4

30 September 1944 (Contract W-30-070-CWS-837, P.O. NY 5-158 CCD started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	3

1 March 1945 (Contract W-30-070-CWS-1219, P.O. NY 5-898 CCD started)

Officer	2
Civilian	
Industrial Division	9
Inspection Division	3

PERSONNEL

CC-2 Plant
Area Engineer and Outside Contractors

Contract W-266-CWS-119 (Peak of construction)

Area Engineer	36
Outside Contractors	370

Contract W-1103-eng-3722 (Peak of construction)

Area Engineer	4
Outside Contractors	140

Contract W-1103-eng-3688 (Peak of construction)

Area Engineer	none
Outside Contractors	3

Contract W-1103-eng-3938, including Supplement (Peak of construction)

Area Engineer	24
Outside Contractors	400

EXPENDITURES AND ALLOTMENTS

CC-2 Plant

			Allotments
CWS 374 P 0-99 A1105-23	For general purposes in connection with CC-2 contracts with Monsanto Chemical Company		$93,571.92
Expended F.Y. 1942 - 1943		$91,160.62	
" F.Y. 1943 - 1944 to date		208.81	
		91,369.43	
CWS 981 P1-99 A0141-03	For general purposes in connection with funds for construction at Monsanto.		74,083.06
Expended F.Y. 1941 - 1942		$34,774.70	
" F.Y. 1942 - 1943		39,308.36	
		$74,083.06	
CWS 3488 P120-99 A1105-23	For General purposes in connection with Procurement Order 2037-42		2,630,000.00
Expended F.Y. 1942 - 1943		$1,697,809.53	
" F.Y. 1943 - 1944		832,681.03	
		2,530,490.56	
*CWS 24310 P310-99 A1105-23	For general purposes in connection with administrative expense, salaries, etc.		15,000.00
Expended F.Y. 1942 - 1943		$13,425.46	
" F.Y. 1943 - 1944		216.20	
		13,641.66	
CWS 24312 P310-99 A1105-24	For Current expenses to maintain plant in standby condition		50,000.00
Expended F.Y. 1943 - 1944		$15,303.43	

*This includes overhead for DAT Plant which cannot be separately determined. For purposes of cost reports, 25% has been charged as DAT's portion of overhead expenses.

CC-2 PLANT

EXPENDITURES AND ALLOTMENTS

1944 - 1945

504-2431 P310-99 A 212/51105

	Allotment	Obligations	Expenditures
July 1944	$24,000.00	$ 2,010.00	$ 1,002.70
Aug.		3,509.23	3,420.15
Sept.	24,000.00	3,685.94	3,595.13
Oct.		18,108.59	18,052.40
Nov.		18,758.00	18,211.42
Dec.		1,300.65	2,231.81
Jan. 1945	24,000.00	17,589.94	17,703.46
Feb.		3,996.17	3,908.23
Mar.		2,630.00	2,629.12
	$72,000.00	$71,578.52	$70,754.42

504-2412 P120-99 A 212/51105

	Allotment	Obligations	Expenditures
July 1944		$ 55.64	$ 48.22
Aug.		4,428.10	4,426.59
Sept.		9,292.88	8,699.71
Oct.			
Nov.		448.36	2.00
Dec.		13,163.39	13,712.77
Jan. 1945		1.06	67.78
Feb.		15,127.83	15,263.08
Mar.		6,232.93	6,231.77
		$48,748.07	$48,451.92

These figures exclusive of Monsanto contracts for material and reimbursements made under said contracts.

No specific allotment under 504-2412 was furnished this office, and therefore is not shown inasmuch as this is a general manufacturing account.

MONTHLY PRODUCTION CC-2

1942		
April	90,473 lbs.	(27 March - 31 April 1942 inclusive)
May	115,755 "	(Contract W-266-CWS-194 completed 16 May 1942
June	114,185 "	(165,800# accepted and shipped
July	87,731 "	
August	131,772 "	
September	182,215 "	
October	247,528 "	(Contract W-266-CWS-219 completed 9 October 1942
November	298,889 "	(603,000# accepted and shipped
December	287,639 "	
1943		
January	300,580 lbs.	
February	259,967 "	
March	364,611 "	
April	365,372 "	
May	400,067 "	
June	406,383 "	
July	431,040 "	
August	446,500 "	
September	446,500 "	(Contract W-266-CWS-266 completed 21 September 1943
October	483,200 "	(4,001,500# accepted and shipped
November	473,135 "	
December	621,414 "	
1944		
January	197,117 lbs.	
February	169,272 "	(Contract W-11-021-CWS-198 completed 15 February 19
March	311,222 "	(1,420,295# CC-2 as such accepted and shipped
April	244,500 "	(579,704# CC-2 contained in XXCC-3 accepted
May	180,777 "	(and shipped
June	174,046 "	(638,755# XXCC-3 accepted and shipped
July	187,628 "	
August	171,951 "	(Contract W-11-021-CWS-239 completed 29 May 1944
September	250,799 "	(520,950# CC-2 as such accepted and shipped
October	245,600 "	(285,030# CC-2 contained in XXCC-3 accepted
November	336,197 "	(and shipped
December	216,125 "	(313,425# XXCC-3 accepted and shipped
1945		(Contract W-11-021-CWS-344 completed 29 September 1
		(579,375# XXCC-3 accepted and shipped
January	297,287 lbs.	(526,951# CC-2 contained in XXCC-3 accepted and
February	275,833 "	(shipped
March	329,948 "	
April	327,535 "	(Contract W-30-070-CWS-937 completed 1 March 1945
		(1,342,500# CC-2 as such accepted and shipped
		(309,044# CC-2 contained in XXCC-3 accepted and
		(shipped
		(339,925# XXCC-3 accepted and shipped

"REVISIONS
Remove Old Sheet
Insert New One

S-330 PLANT

Manufacturing Superintendent of the S-330 Plant is Mr. J. F. Stickley, and Department Superintendent is Mr. E. E. Poenack for the Monsanto Chemical Company.

Major J. T. Baughman, who reported to this station for duty 26 August 1943, is the Commanding Officer and Contracting Officer's representative for this plant.

Weekly Works Letters, Weekly Operations Reports and Monthly Operations Reports from April 1944 to current date, covering operations, development work, labor and personnel, production and raw material consumption are available at the following offices:

Office of Chief, Chemical Warfare Service, Industrial Division, Mfg. and Proc. Branch, Washington, D. C.

Office of Chief, Chemical Warfare Service, Technical Division, Edgewood Arsenal, Maryland

Office of Chief, Chemical Warfare Service, Industrial Liaison Branch, Edgewood Arsenal, Maryland

Complete set of specifications and blueprints, showing location, layout and details of equipment is available at the following offices:

Office of Chief, Chemical Warfare Service, Industrial Division, Facilities and Requirements Branch, Washington, D. C.

Office of Chief, Chemical Warfare Service, Technical Division, Edgewood Arsenal, Maryland

Production schedules for the S-330 Plant varied from a start of approximately 21,000# in April 1944, to a peak of approximately 200,000# in November 1944. Schedules were then reduced to 75,000# per month in February 1945. On 17 May 1945 directions were received to terminate the contract by working out all stocks then in process, and closing down the plant.

"REVISED-
Remove Old Sheet
Insert New One

S-330 PLANT

Operating Contract

Contract No. W-18-035-CWS-265 13 December 1943

Pilot Plant Research Contract with the Technical Division for production of S-330 for Chemical Warfare Service experimental purposes.

Prime Contractor - Monsanto Chemical Company

Amount - $50,644.44

Date Started - 3 March 1944

Date Completed - 26 May 1944

Total Produced - 35,760#

Supplemental Agreement No. 1 5 April 1944

Amount Increased $10,000.00

Total amount due under contract - $60,644.44

Contract extended up to and including 5 July 1944, to obtain additional information and data on product S-330.

"[illegible]"
Remove Old Sheet
Insert New One

S-330 PLANT

Operating Contract

Contract No. W-11-021-CMS-290 4 April 1944

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $213,720.00 (estimated)

Reduced to $210,576.25 (estimated) Supplemental Agreement No. 1
" " $194,616.25 (estimated) " " No. 2
Changed " $257,751.53 (estimated) " " No. 3

Pounds to be produced - 156,000#

Queeny Plant - 36,000#

Interim Plant - (CMS HAT Plant) 120,000#
Increased to 180,000# by Supplemental Agreement No. 3

Price per Pound

Queeny Plant - $1.87 per pound for specification
$1.77 per " " non-specification

$1.76 " " " specification) Supplemental Agree-
$1.66 " " " non-specification) ment No. 2

Interim Plant - $1.22 per pound for specification
$1.12 " " " non-specification

$1.12 " " " specification) Supplemental Agree-
$1.02 " " " non-specification) ment No. 2

Date Started - 1 May 1944

Date Completed - 18 August 1944

Total Accepted - 184,825# (Interim Plant)
36,300# (Queeny Plant)
221,125# Total both plants

REVISED
Remove Old Sheet
Insert New One

S-330 PLANT

Operating Contracts

Contract No. W-11-021-eng-363 — 31 July 1944

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - Not to exceed $497,993.75

Pounds to be produced - 585,875#

Price per pound - $0.85 for specification
$0.80 for non-specification

Date Started - 6 September 1944

Date Completed - 4 December 1944

Contract No. W-30-070-CMS-1081 — 13 December 1944
(MY 5-5hh OCD)

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $133,008.00

Pounds to be produced - 510,000#

Price per pound - $.2608

Date Started - 1 December 1944

Date Completed - 23 February 1945

"ADDITIONAL"

S-330 PLANT

Operating Contracts

Contract No. W-30-070-CWS-1218 (NY 5-897 CCD) — 20 April 1945

For the production of S-330

Prime Contractor - Monsanto Chemical Company

Amount - $120,000.00

Pounds to be produced - 300,000#

Price per pound - $.40

Date Started - 1 March 1945

Date Completed - Current

DAT PLANT

Manufacturing Superintendent of the DAT Plant was Mr. Joseph F. Stickley. Production Supervisor was Mr. A. G. Mutterer.

Captain Leo J. Hardin reported for duty at the St. Louis Plant, C.W.S. on 22 December 1941, and was assigned to the DAT Plant. Captain Hardin was transferred to the Chicago Chemical Warfare Procurement District on 10 May 1943. At the present time he is on duty at Camp Detrick, Frederick, Maryland.

On 5 January 1942, Major Willard L. Finley assumed duties at St. Louis Plant, C.W.S., as Commanding Officer. Major Finley was transferred from this station 10 August 1942. He is on duty with the Army Air Force, Army Air Force Depot, Gadsden, Alabama, at the present time.

Lt. Colonel Frank R. Johnson reported to this station as Commanding Officer 8 August 1942, and was transferred to the Office of the Chief, Chemical Warfare Service, Washington, D. C., 12 April 1943 where he is on duty at the present time.

Captain Raymond J. Schadt assumed command of this plant 7 April 1943 and was transferred to the Chicago Chemical Warfare Procurement District, 4 October 1943.

Major Jim T. Baughman reported to this plant as Commanding Officer 26 August 1943, and is on duty here at the present time.

The Plant was specially built to make one product — DAT — for the Chemical Warfare Service. Manufacture of DAT has been discontinued by order of the Office of Chief, Chemical Warfare Service. Until closed down on 2 November 1943, it was operating very closely to the original operating plans. It is contemplated to rehabilitate the existing plant in order that a new product, designated as B-330, can be made there.

Complete set of specifications and drawings, showing location, layout and details of equipment, is available at Office of Chief, Chemical Warfare Service, Construction Division, Washington, D. C.

Monthly production figures of DAT for the period August 1942 to November 1943, are as shown on attached sheet.

Expenditures and allotments by fiscal years are indicated on attached sheet.

Chemical Warfare Service, Monsanto, Area Engineer and construction personnel were as shown on the attached sheets.

ORIGINAL DAT PLANT

Contract No. DA-W-266-CWS-1 27 August 1941

St. Louis Plant, C.W.S., Unit No. 2 10,400 sq. ft. in floor area, designed to produce 240 tons of DAT per annum. (Plans No. A-1 thru A-9)

Water System
- Water mains 378 lin. ft., cast iron, oakum-lead joints (Plan No. W-1)
- Water Service Lines 575 " " " " " " (Plan No. P-1)

Sewer System
- Sanitary Sewer Mains 413 lin. ft. vitrified tile (Plan No. P-1)
- Storm Sewer Lines 415 " " farm and vitrified tile (Plan No. A-2)

Electric System
- Underground Distr. Lines, 700 lin. ft., Koreduct, concrete encased. (Plan No. EL-1)
- Underground Services, 1, 3 phase, 440 volts, 500 MCM. (Plan No. EL-1)
- Ext. Lighting System, 8 lights, 200 watt lamps. (Plan No. EL-1)
- Distr. Line Transformers, 30 KVA, three, 10 KVA, 440/220-110 volts, air cooled, wall mounted. (Plan No. EL-2)

Central Heating Plant
- Distribution Lines, 377 lin. ft., seamless steel pipe (Plan No. H-1)

Roads
- Concrete, 1725 sq. yds., reinforced, 20' wide, 8" thick (Plan No. A-10)

Railroads
- Trackage, .047 miles, Standard gauge, 100# rail. (Plan No. A-2)

Other Post Areas, 2.22 (Approx.) Additional site grounds. (Plan No. A-1)

Prime Contractor - Monsanto Chemical Company

Original Estimate - $449,021

Cost - $444,534

Date Started - 23 December 1941

Date Completed - 31 July 1942

Date Accepted from Area Engineer - 31 July 1942

ADDITION TO DAT PLANT

Contract No. DA-W-CWS-1 Supplement B 24 July 1942

An addition, comprising approximately 5,000 sq. ft. of floor space, made to the existing plant, in which there was installed manufacturing machinery and equipment capable of producing 80,000 pounds of DAT per month.

Service building comprising approximately 5,500 sq. ft. of floor area.

Prime Contractor - Monsanto Chemical Company

Original Estimate - $373,610

Expended to 9/25/43 - $260,318

Date Started - 17 August 1942

Date Completed - 31 May 1943

Date Accepted from Area Engineer - 15 July 1943

DAT OPERATING CONTRACTS

Contract No. W-266-CWS-227 — 29 June 1942

For the production of DAT

Primary Contractor - Monsanto Chemical Company

Amount - $144,000

Amount Refunded by Monsanto - $52,247.56

Price per Pound - $.30

Pounds to be Produced - 480,000 lbs.

Date Started - 1 August 1942

Date Completed - 12 February 1943

Contract No. W-799-CWS-827 — 28 January 1943

For the production of DAT

Primary Contractor - Monsanto Chemical Company

Amount - $330,000

Amount Refunded by Monsanto - Refund negotiations not yet completed by Monsanto Chemical Company

Price per Pound - $.22
$.219 (Per Supplemental No. 1 to above contract)

Pounds to be Produced - 1,500,000 lbs.

Date Started - 12 February 1943

Date Completed - Plant Shutdown 2 November 1943
755,382 lbs. produced as of that date

MONTHLY PRODUCTION FIGURES - BAT

1942

August	43,578 pounds
September	69,064 pounds
October	78,530 pounds
November	85,139 pounds
December	86,017 pounds

1943

January	80,090 pounds
February	96,827 pounds *
March	113,182 pounds
April	40,852 pounds
May	76,560 pounds
June	89,425 pounds
July	93,752 pounds
August	95,662 pounds
September	87,669 pounds
October	91,464 pounds
November	7,571 pounds

755,382 pounds produced on Contract W-799-CWS-827 (not completed)

Total produced 1,235,382 pounds

Shipped, as of 10 December 1943, 1,091,593 pounds

On hand, as of 10 December 1943, 143,789 pounds

*12 February 1943, Contract W-266-CWS-227 completed

EXPENDITURES AND ALLOTMENTS

DAT Plant

	Allotments
CWS 3381 P120-99 A1105-23	$151,205.90
Expended F.Y. 1943	151,205.90
CWS 8254 P121-99 A1105-23	11,342.92
Expended F.Y. 1943	11,342.92
CWS 24121 P121-99 A1105-23	284,033.29
Expended F.Y. 1943	284,033.29
4-424120 P120 -99 A212/41105	1,719.86
Expended F.Y. 1944	1,719.86
CWS 3438 P120 -99 A1105-23	2,630,000.00
Expended F.Y. 1943 (balance for CC-2 plant)	4,888.57

Administrative and overhead costs for DAT are not included here, but are shown with expenditures for CC-2 Plant. An arbitrary figure of 25% has been charged to the DAT Plant in cost reports.

PERSONNEL

DAT Plant
Monsanto Chemical Company

	Hourly	Salary
1 August 1942 (Initial date of operations, Contract W-266-CWS-227)		
Operating	8	5
Maintenance	0	0
Office	0	1
12 February 1943 (Contract W-266-CWS-227 completed, and Contract W-799-CWS-827 started)		
Operating	28	6
Maintenance	1	0
Office	0	1
2 November 1943 (Plant shutdown)		
Operating	10	4
Maintenance	1	0
Office	0	0

Area Engineer and Outside Contractors

Contract DA-W-266-CWS-1 (Peak of construction)	
Area Engineer	28
Outside Contractors	180
Contract DA-W-266-CWS-1, Supplement B (Peak of construction)	
Area Engineer	10
Outside Contractors	110

Chemical Warfare Service

One C.W.S. officer and one C.W.S. civilian assigned to the DAT Plant.

(10) HISTORICAL INFO

MONSANTO CHEMICAL COMPANY

Department 260

CC: Major Baughman (1
Messrs. Tompkins
Cottrell
Mares
Stickley
(3

June 9, 1945

Mr. W. G. Krummrich, (6)

Subject: Historical Record St. Louis C.W.S. Plant

Conforming with Major Clarke Robinson's first indorsement of May 21, 1945 covered by Major J. T. Baughman's memorandum of May 28, 1945 we are supplementing our previous historical record of the St. Louis Chemical Warfare Service Plant furnished on August 18, 1944. We are complying with Section 2.a., 2.b., and 2.c. of Major Robinson's request of May 21 for additional historical data covering the difficulties encountered during the preliminary operation of the old CC-2 Plant. Major Robinson's request was submitted to us May 28 by Major Baughman. The following discussion will cover the period from January or February of 1942 up to February 4, 1944 at which time the Old CC-2 Plant was shut down and placed in stand-by condition. Difficulties encountered and the solutions affected in the CC-2 extension plant will be covered under a separate historical account of the operation of the S-330 Plant and the CC-2 Plant since August 1944.

From the start of these operations in 1942 up to June 1, 1945, eight contracts have been negotiated for CC-2 production at the Monsanto-operated CWS Plant and during this period approximately 10,850,000 pounds of CC-2 were produced; 1,700,000 pounds of this being further processed into XXCC-3.

Because of the urgent demand for CC-2, the original facilities were altered to not only overcome the initial operating problems but also to increase the plant capacity above its rated capacity. Confronted with this urgent situation, a research and engineering program was initiated. As a result of this program, production in the original plant was increased to a peak of 500,000 pounds per month. At the same time the quality of CC-2 was steadily improved. During the first year yields of about 43% to 45% of theory were attained as compared to a yield of 59 to 60% at the time operations were terminated in the original Department 260 between January 28 and February 4, 1944.

In general the problems encountered in the Old CC-2 Plant may be summarized under five main groups:

Corrosion problems.
Ventilation problems.
Quality problems.
Production problems.
Yields.

Corrosion Problems

The entire CC-2 process involves the use of highly corrosive liquids, gases, and solids and from the very beginning of these plants corrosion has caused the most serious difficulties. The copper evaporators, copper pipe lines, copper evaporator vapor lines, heating coils, and copper condensers had an extremely short life. Difficulties became apparent after one or two months operation in this section of the plant. Over a period of a number of months such difficulties were overcome by the use of glass-enameled steel evaporators (agitated), Karbate condensers, Hastelloy "C" heating elements, and Karbate vapor pipes. With these alterations little or no difficulty has been encountered in the evaporator section.

Serious difficulty was encountered in handling the molten P-1 which had to be maintained at temperatures of 75° to 85°C. In the original design of these plants P-1 was to be washed in lead-lined melting tanks and transported through heated lead pipes. Lead proved to be a very poor material of construction for this purpose and innumerable leaks developed in tank linings and piping. Lead weigh tanks were likewise used for molten P-1 delivered to Step II and here again replacements had to be made every several months. These difficulties were overcome by using brick-lined, continuous washing and melting tanks for P-1 in place of the older lead-lined melt tanks. Pipe lines, although still lead, were so arranged that overheating was prevented and a reasonable life was obtained from such lines.

Durichlor and Durimet pumps were used throughout the plant for transporting S-1 and the various filtrates and slurries. These pumps resisted corrosion reasonably well but the Durichlor pumps were particularly fragile and numerous repairs and replacements were found necessary. Packing difficulties were serious on all of the pumps because of the corrosive liquids handled and this packing problem was never completely solved although the use of pressure lubrication on the packing glands using Manzell lubricators was however very beneficial.

In the original design of the plants interconnection of air piping with the chlorine handling system resulted in occasional back pressure which permitted chlorine to enter not only the air system but also the system actuating the control instruments. Very early in the project it was necessary to rearrange this air piping and to gradually replace the copper tubing used for the instruments with Saran tubing which proved to be quite satisfactory.

The original ventilating system of the plant was made of galvanized steel throughout. Portions of this were however protected by means of protective coatings. Such protection was inadequate for the vapors emanating from various sources and the wet HCl chlorine mixture containing organic solvent readily attacked this metal. Lithcoated steel, and wooden pipe were tried in succession. The corrosion problem was eventually solved by the use of Haveg fume duct.

Ventilation Problems

The four-story building furnished with the design made ventilation difficult. Fumes were serious on almost all floors. Added to this stoppages to the closed sewer system throughout the building (particularly on the first floor) resulted in conditions which made improved ventilation imperative. Great difficulty was encountered in obtaining this ventilation equipment. As temporary expedients two additional roof ventilators were placed in the fourth floor roof and another roof ventilator was placed above the filter presses at the evaporators on the second floor. Poorly ventilated areas on the first floor were helped to some extent by 42 propellor-type wall ventilators installed in the north and south walls on the first floor. Thirty thousand c.f.m. blowers were installed in the airwells on the second and third floor so that fresh air could be pumped into the building to relieve fume conditions when they arose. These fans were particularly useful in this district during the summer months when they were in continuous operation.

Due to the rapid deterioration of the blowers producing suction on the regular fume absorption system new fans were installed as auxiliaries in case of break downs and repairs to the original fans. Because of the extensive maintenance and difficulty in obtaining repairs these blowers were finally replaced by air aspirators (Haveg Venturis). These Venturis have operated entirely satisfactorily with little or no attention.

Quality Problems

Quality difficulties were extensive during the first year to year and one-half of this process. Monsanto employed a staff of research chemists in their main research laboratories at St. Louis to study phases of this problem and develop improvements for Steps I, II, and III. In addition to this, a corps of technical graduates was retained in a supervisory capacity on shifts for the purpose of obtaining the most satisfactory results from the standpoint of production and yield. Among the more important changes made in the operating procedure the following are enumerated:

1. The use of presaturation of the S-1 R-1 reactor mixture by means of HCl to prevent the stepwise addition of both R-1 and R-2. By this means the capacity of the Step-I reactor system was materially increased and the frequent difficulty with black batches resulting from an insufficiency of R-1 was eliminated.

2. Careful control of the Step-II reaction was one of the principal reasons for improving the overall CC-2 yield.

3. Rearrangement of cycles on Step-III, reduction of the time required for the addition of R-5, the careful control of the pH and the S-1 concentration of the Step-III slurry resulted in improved Step-III yields. Physical losses of P-3 were also carefully guarded against by means of auxiliary filters or wier boxes which were installed to catch values in wash water from the Step-III presses.

4. In the case of Step-I; in addition to the use of the presaturation technique for the Step-I solvent, early research work disclosed that the quality of the finished product depended very much upon the purity of the P-1 recovered from the Step-I filter presses. The operation of these filter presses had given extremely poor results during the first year because of poor distribution of the solvent wash through the sections of the press and the resulting poor washing of the cake. The handling of this filter cake was very objectionable because of the B-1 and S-1 fumes. It was difficult to obtain competent workmen to carry out this objectionable but important step in the operation. Monsanto was finally able to install two rubber-covered Bird centrifuges for centrifuging this product. By this means very satisfactory washing was possible, resulting in a P-1 of good color and high crystallizing point. The centrifuged cake also retained only a fraction of the amount of S-1 which normally remained in filter press cake and S-1 losses were thereby materially reduced. P-1 obtained by this method gave exceptionally good results in both Step-II and Step-III and eliminated the difficulties due to "insolubles" which had been so annoying during the early periods of operation in this plant.

Production Problems

CC-2 production steadily increased throughout the operation of the Old CC-2 Plant. During the first months of operation production amounted to less than 100,000 pounds per month. Because of the numerous difficulties enumerated above progress was slow but production increased gradually reaching about 300,000 pounds per month by the end of 1942. Some of this increase was the result of an expansion program started almost immediately after the CC-2 Plants initiated operations. Such an expansion eventually amounted to $400,000.00 to $450,000.00. With the aid of necessary facilities not included in the original plant production had been increased in the St. Louis Plant to 400,000 pounds per month by May 1943 and a total of 449,000 pounds production was reached in November, 1943 and 507,000 pounds per month in December of 1943. In the New Plant (Department 260 Expansion) production was started in November 1943 so that the total CC-2 production at the St. Louis Plant was about 480,000 pounds per month in November 1943 and 621,000 pounds per month in December 1943. December production could have been considerably increased had it not been for instructions from the Chemical Warfare Service which necessitated curtailment in CC-2 production during the latter part of the month. It was estimated from production experience that the capacity with both CC-2 units operating fully would reach 800,000 to 1,000,000 pounds per month with few if any alterations.

Yields

Yield difficulties followed the same pattern as quality difficulties. As a result of steady research work in the Research Department as well as plant investigational work and technical plant supervision numerous new operating improvements were made which brought the overall yield of CC-2 based on R-1 from approximately 40% during early parts of 1942 to 60% at the time the plant was shut down in January or February of 1944. Subsequent operations in the plant expansion have resulted in steadily improving yields so that the original yield figure in the Expansion Unit of approximately 60% had reached 68.4% by May of 1945. The improvements in yield resulted from the solution of chemical as well as mechanical difficulties. Most important among these were the saturation of Step-I filtrate, the improved washing and centrifugation of P-1, careful control of Step-II, and improved operating efficiency on Step-III together with the provision of adequate filtration devices to prevent losses from the Step-III filters. In addition to these factors the use of a P-1 steam distillation for recovering P-1 values from Step-II evaporator residues was very important.

With respect to management problems and solutions we believe that there have been no serious difficulties or innovations. Varying schedules, the critical manpower position in this district, the requirements for speedy repairs, installations, and alterations all added to the difficulty of this job. We were particularly fortunate in obtaining an adequate force of competent technical help and competent supervisors, and the transfer of experienced personnel from the main Monsanto plant as well as the use of a substantial part of their mechanical force proved of immeasurable help.

Jos. F. Stickley

Jos. F. Stickley
Manufacturing Superintendent

JFS/ob

RECOMMENDATION FOR RETENTION OF INDIVIDUAL INSTALLATION IN CWS POSTWAR ESTABLISHMENT

WAR DEPARTMENT OWNED

1. Name: ST. LOUIS PLANT CWS Program: CC2- XXCC3, S-330

2. Location: Monsanto, Illinois

3. Facility Cost:

a.	Land	$ 7,763
b.	Buildings	3,024,807
c.	Production Equip.	2,662,178
d.	Other	78,864
	Total	$5,753,612

4. Maintenance:

a.	Annual Cost	$ 97,800
b.	Number of Employees	24

5. Capacity of Plant by Products:

a. CC2 - XXCC3 - 250 T/mo.
b. S-330 - 76 T/mo.

6. Proposed Status of Plant: Standby

7. Length of time to put into operation:

a. Initial Operation - 4 months
b. Full Operation - 6 months

8. Justification for Retention: The St. Louis Plant CWS can provide reserve capacity for CC2, XXCC3 and S-330, chemicals which were developed especially for military use. CC2 and XXCC3 are clothing impregnating chemicals, and S-330 is a component of protective ointment. Manufacture of these chemicals takes place in special purpose plants. There is no commercial production. Storage for long periods of time is not feasible. Reserve capacity is estimated as that necessary to support the Army for M-Day plus six months, during which time additional facilities can be provided.

The St. Louis Plant CWS is considered particularly desirable for retention in standby because of its excellent location with respect to security transportation, accessibility of labor, materials and components, and because of its low production and maintenance costs. The St. Louis Plant CWS can supply approximately 50% of the reserve capacity for CC2- XXCC3 (Niagara Falls Plant CWS can supply the balance) and all of the required reserve capacity for S-330. The civilian operator of the plant, Monsanto Chemical Company, has shown interest in leasing the plant for peacetime use.

The Chemical Warfare Service also supplies Air Force, Navy and Marine Corps requirements for these chemicals.

(10) HISTORICAL INFO

DUP

MONSANTO CHEMICAL COMPANY

Department 260

CC: Major Baughman (5
Messrs. Tompkins
Cottrell
Mares
Stickley
(3

June 9, 1945

Mr. W. G. Krummrich (6)

Subject: Historical Record St. Louis C.W.S. Plant

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From the start of these operations in 1942 up to June 1, 1945, eight contracts have been negotiated for CC-2 production at the Monsanto-operated CWS Plant and during this period approximately 10,850,000 pounds of CC-2 were produced; 1,700,000 pounds of this being further processed into XXCC-3.

Because of the urgent demand for CC-2, the original facilities were altered to not only overcome the initial operating problems but also to increase the plant capacity above its rated capacity. Confronted with this urgent situation, a research and engineering program was initiated. As a result of this program, production in the original plant was increased to a peak of 500,000 pounds per month. At the same time the quality of CC-2 was steadily improved. During the first year yields of about 43% to 45% of theory were attained as compared to a yield of 39 to 50% at the time operations were terminated in the original Department 260 between January 28 and February 4, 1944.

In general the problems encountered in the Old CC-2 Plant may be summarized under five main groups:

Corrosion problems.
Ventilation problems.
Quality problems.
Production problems.
Yields.

Corrosion Problems

The entire CC-2 process involves the use of highly corrosive liquids, gases, and solids and from the very beginning of these plants corrosion has caused the most serious difficulties. The copper evaporators, copper pipe lines, copper evaporator vapor lines, heating coils, and copper condensers had an extremely short life. Difficulties became apparent after one or two months operation in this section of the plant. Over a period of a number of months such difficulties were overcome by the use of glass-enameled steel evaporators (agitated), Karbate condensers, Hastelloy "C" heating elements, and Karbate vapor pipes. With these alterations little or no difficulty has been encountered in the evaporator section.

Serious difficulty was encountered in handling the molten P-1 which had to be maintained at temperatures of 75° to 85°C. In the original design of these plants P-1 was to be washed in lead-lined melting tanks and transported through heated lead pipes. Lead proved to be a very poor material of construction for this purpose and innumerable leaks developed in tank linings and piping. Lead weigh tanks were liksvise used for molten P-1 delivered to Step II and here again replacements had to be made every several months. These difficulties were overcome by using brick-lined, continuous washing and melting tanks for P-1 in place of the older lead-lined melt tanks. Pipe lines, although still lead, were so arranged that overheating was prevented and a reasonable life was obtained from such lines.

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In the original design of the plants interconnection of air piping with the chlorine handling system resulted in occasional back pressure which permitted chlorine to enter not only the air system but also the system actuating the control instruments. Very early in the project it was necessary to rearrange this air piping and to gradually replace the copper tubing used for the instruments with Saran tubing which proved to be quite satisfactory.

The original ventilating system of the plant was made of galvanized steel throughout. Portions of this were however protected by means of protective coatings. Such protection was inadequate for the vapors emanating from various sources and the wet HCl chlorine mixture containing organic solvent readily attacked this metal. Lithcoated steel, and wooden pipe were tried in succession. The corrosion problem was eventually solved by the use of Haveg fume duct.

Ventilation Problems

The four-story building furnished with the design made ventilation difficult. Fumes were serious on almost all floors. Added to this stoppages to the closed sewer system throughout the building (particularly on the first floor) resulted in conditions which made improved ventilation imperative. Great difficulty was encountered in obtaining this ventilation equipment. As temporary expedients two additional roof ventilators were placed in the fourth floor roof and another roof ventilator was placed above the filter presses at the evaporators on the second floor. Poorly ventilated areas on the first floor were helped to some extent by 4Z propellor-type wall ventilators installed in the north and south walls on the first floor. Thirty thousand c.f.m. blowers were installed in the airwells on the second and third floor so that fresh air could be pumped into the building to relieve fume conditions when they arose. These fans were particularly useful in this district during the summer months when they were in continuous operation.

Due to the rapid deterioration of the blowers producing suction on the regular fume absorption system new fans were installed as auxiliaries in case of break downs and repairs to the original fans. Because of the extensive maintenance and difficulty in obtaining repairs these blowers were finally replaced by air aspirators (Haveg Venturis). These Venturis have operated entirely satisfactorily with little or no attention.

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Quality difficulties were extensive during the first year to year and one-half of this process. Monsanto employed a staff of research chemists in their main research laboratories at St. Louis to study phases of this problem and develop improvements for Steps I, II, and III. In addition to this, a corps of technical graduates was retained in a supervisory capacity on shifts for the purpose of obtaining the most satisfactory results from the standpoint of production and yield. Among the more important changes made in the operating procedure the following are enumerated:

1. The use of presaturation of the S-1 R-1 reactor mixture by means of HCl to prevent the stepwise addition of both R-1 and R-2. By this means the capacity of the Step-I reactor system was materially increased and the frequent difficulty with black batches resulting from an insufficiency of R-1 was eliminated.

2. Careful control of the Step-II reaction was one of the principal reasons for improving the overall CC-2 yield.

3. Rearrangement of cycles on Step-III, reduction of the time required for the addition of R-5, the careful control of the pH and the S-1 concentration of the Step-III slurry resulted in improved Step-III yields. Physical losses of P-3 were also carefully guarded against by means of auxiliary filters or wier boxes which were installed to catch values in wash water from the Step-III presses.

4. In the case of Step-I; in addition to the use of the presaturation technique for the Step-I solvent, early research work disclosed that the quality of the finished product depended very much upon the purity of the P-1 recovered from the Step-I filter presses. The operation of these filter presses had given extremely poor results during the first year because of poor distribution of the solvent wash through the sections of the press and the resulting poor washing of the cake. The handling of this filter cake was very objectionable because of the B-1 and S-1 fumes. It was difficult to obtain competent workmen to carry out this objectionable but important step in the operation. Monsanto was finally able to install two rubber-covered Bird centrifuges for centrifuging this product. By this means very satisfactory washing was possible, resulting in a P-1 of good color and high crystallizing point. The centrifuged cake also retained only a fraction of the amount of S-1 which normally remained in filter press cake and S-1 losses were thereby materially reduced. P-1 obtained by this method gave exceptionally good results in both Step-II and Step-III and eliminated the difficulties due to "insolubles" which had been so annoying during the early periods of operation in this plant.

Production Problems

CC-2 production steadily increased throughout the operation of the Old CC-2 Plant. During the first months of operation production amounted to less than 100,000 pounds per month. Because of the numerous difficulties enumerated above progress was slow but production increased gradually reaching about 300,000 pounds per month by the end of 1942. Some of this increase was the result of an expansion program started almost immediately after the CC-2 Plants initiated operations. Such an expansion eventually amounted to $400,000.00 to $450,000.00. With the aid of necessary facilities not included in the original plant production had been increased in the St. Louis Plant to 400,000 pounds per month by May 1943 and a total of 449,000 pounds production was reached in November, 1943 and 507,000 pounds per month in December of 1943. In the New Plant (Department 260 Expansion) production was started in November 1943 so that the total CC-2 production at the St. Louis Plant was about 480,000 pounds per month in November 1943 and 621,000 pounds per month in December 1943. December production could have been considerably increased had it not been for instructions from the Chemical Warfare Service which necessitated curtailment in CC-2 production during the latter part of the month. It was estimated from production experience that the capacity with both CC-2 units operating fully would reach 800,000 to 1,000,000 pounds per month with few if any alterations.

Yields

Yield difficulties followed the same pattern as quality difficulties. As a result of steady research work in the Research Department as well as plant investigational work and technical plant supervision numerous new operating improvements were made which brought the overall yield of CC-2 based on R-1 from approximately 40% during early parts of 1942 to 60% at the time the plant was shut down in January or February of 1944. Subsequent operations in the plant expansion have resulted in steadily improving yields so that the original yield figure in the Expansion Unit of approximately 60% had reached 68.4% by May of 1945. The improvements in yield resulted from the solution of chemical as well as mechanical difficulties. Most important among these were the saturation of Step-I filtrate, the improved washing and centrifugation of P-1, careful control of Step-II, and improved operating efficiency on Step-III together with the provision of adequate filtration devices to prevent losses from the Step-III filters. In addition to these factors the use of a P-1 steam distillation for recovering P-1 values from Step-II evaporator residues was very important.

With respect to management problems and solutions we believe that there have been no serious difficulties or innovations. Varying schedules, the critical manpower position in this district, the requirements for speedy repairs, installations, and alterations all added to the difficulty of this job. We were particularly fortunate in obtaining an adequate force of competent technical help and competent supervisors, and the transfer of experienced personnel from the main Monsanto plant as well as the use of a substantial part of their mechanical force proved of immeasurable help.

Jos. F. Stickley

Jos. F. Stickley
Manufacturing Superintendent

JFS/ob

RECOMMENDATION FOR RETENTION OF INDIVIDUAL INSTALLATION IN CWS POSTWAR ESTABLISHMENT

WAR DEPARTMENT OWNED

1. Name: ST. LOUIS PLANT CWS Program: CC2- XXCC3, S-330

2. Location: Monsanto, Illinois

3. Facility Cost:

a.	Land	$ 7,763
b.	Buildings	3,024,807
c.	Production Equip.	2,662,178
d.	Other	78,864
	Total	$5,763,612

4. Maintenance:

a.	Annual Cost	$ 97,800
b.	Number of Employees	24

5. Capacity of Plant by Products:

a. CC2 - XXCC3 - 250 T/mo.
b. S-330 - 76 T/mo.

6. Proposed Status of Plant: Standby

7. Length of time to put into operation:

a. Initial Operation - 4 months
b. Full Operation - 6 months

8. Justification for Retention: The St. Louis Plant CWS can provide reserve capacity for CC2, XXCC3 and S-330, chemicals which were developed especially for military use. CC2 and XXCC3 are clothing impregnating chemicals, and S-330 is a component of protective ointment. Manufacture of these chemicals takes place in special purpose plants. There is no commercial production, Storage for long periods of time is not feasible. Reserve capacity is estimated as that necessary to support the Army for M-Day plus six months, during which time additional facilities can be provided.

The St. Louis Plant CWS is considered particularly desirable for retention in standby because of its excellent location with respect to security transportation, accessibility of labor, materials and components, and because of its low production and maintenance costs. The St. Louis Plant CWS can supply approximately 50% of the reserve capacity for CC2- XXCC3 (Niagara Falls Plant CWS can supply the balance) and all of the required reserve capacity for S-330. The civilian operator of the plant, Monsanto Chemical Company, has shown interest in leasing the plant for peacetime use.

The Chemical Warfare Service also supplies Air Force, Navy and Marine Corps requirements for these chemicals.

(1) HISTORICAL INFO

The following facilites were authorized during the first half of FY44:
additional cost (223,000) for the CC-2 plant
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Monsanto CC2 Plant

This facility was completed for initial operation during the first half of FY 1942

During the first half of FY43, a plant expansion was authorized and started.

Additional funds were authorized and construction started during FY (second half) 43 for additional equipment and increase in cost. (990,000)

Monsanto CC2 Plant was completed during FY43 (1,875,000).
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

St. Louis Plant - FY 1953: Congressional approval obtained and action taken by GSA to sell this plant [Operation Clean Sweep, 1958 - 1960]

Monsanto DT Plant

Facility was completed for intial operation during FY 1942

Monsanto DDT #2 was completed during FY43 (387,000).
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Niagara Falls CC2 Plant
see also Hooker

This facility was completed for initial operation during the first half of FY 1942

First Half of FY 1943: Numerous small facilities were authorized and started: New Plant (2,305,000)

Additional funds were authorized and construction started during FY (second half) 43 for additional equipment and increase in cost. (809,000)

Niagara Falls CC2 Plant #2 was completed during FY 43. (2,305,000)
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Niagara Falls HC Plant

The following facilites were authorized during the first half of FY44:
addition cost for the HC plant
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

(35) HISTORICAL DATA.

[redacted]

CHICAGO CHEMICAL [illegible] DIVISION

226 WEST JACKSON BOULEVARD

CHICAGO 6, ILLINOIS

1 JANUARY 1955 TO 31 MARCH 1955

[redacted]

[illegible]

[illegible] conditions. The pellets produced were found to be homogeneous [illegible] mechanically stable, and capable of being consolidated under 1000 psi pressure into canisters that meet all specified performance and function requirements. It was found that the propelleting process could be accomplished with little modification of the standard colored smoke formulations. However, changing the formulation even slightly had great effects upon the operational and production handling characteristics, (colors fading, flaming, altered burning time, etc.) so that considerable amount of experimentation was required to achieve optimum and acceptable conditions. The contractor also indicated that his smoke powders could be granulated by a less costly process than pelletizing and recommended that this method of preparing smoke powders for loading operations be explored further. The Planning Division made an engineering evaluation of this report and agreed with the technical conclusions of the contractor and recommended that further studies in this field be pursued.

c. Standby Plants

Inspections

Annual Inspections of the following plants were completed:

(1) Columbus Clothing Impregnation Plant - Columbus, Ohio
(2) Kansas City Clothing Impregnation Plant - Kansas City, Missouri
(3) St. Louis CAIC Plant, [illegible], Illinois
(4) [illegible] CAIC Plant - Terre Haute, Indiana

6. Inventory of Production Equipment

a. [illegible] production facilities [illegible] by the [illegible] of [illegible]-17-6-26 and Chemical Corps [illegible] No. 10, [illegible]

Rehabilitation Program

A rehabilitation program was initiated at the Kansas City Clothing Impregnation Plant. The project, which was scheduled for completion by the end of June 1955, consisted of the removal of various elements of scrap material that had accumulated in the plant and the collection and storage in closed containers, adjacent to parent equipment, of all small subassemblies, machine components, etc., that had previously been scattered at random throughout the plant. Measures were also taken to dispose of the many items of an "off-the shelf" character that are presently stored in the facility. It is contemplated that rehabilitation operations in this plant will be continued into FY 56.

8. Inventory of Production Equipment

a. The Monsanto Chemical Corporation completed the physical inventory of production facilities at the CmIC Monsanto Plant as provided in SR-17-5-25 and Chemical Corps Materiel Command Instruction No. 10.3-54.

b. The American Laundry Machinery Company of Cincinnati, Ohio, has commenced operations on the necessary physical inventory of production facilities at the Columbus Clothing Impregnation Plant. The aforementioned company will proceed to make an inventory of the Kansas City Clothing Impregnation Plant when it completes the inventory at the Columbus facility. It is contemplated that the entire inventory for both plants will be accomplished before December 1955.

SMALL BUSINESS

1. During the quarter Small Business Firms received 65% of the total number of awards and 63% of the dollar value of procurement suitable to Small Business. (See table No. 5)

2. No Certificates of Competency were issued during the quarter by the S. B. A. certifying firms as competent as to credit and capacity to fulfill contracts with this procurement office.

3. During the quarter seven joint determinations Form SBA 7C were submitted by the Small Business Administration and approved by this office. The estimated value totaled $140,264. Awards made to date totaled $387,992.

4. One hundred and twenty-five representatives of business firms were interviewed regarding bidders list applications or application to figure invitations published in the Department of Commerce Synopsis.

[illegible] Division, Chicago Chemical Warfare Procurement District, 20 N. Wacker Drive, Chicago, Illinois. To: Office of the Chief, CWS, Washington, D.C. Attn: Chief, Industrial Division, Labor Relations Officer. January 11, 1943.

(37) GENERAL REPORTS
INFO

1. For your information.

2. You will be promptly advised of further efforts to organize these guards.

For the Commanding Officer:

J. T. FISH,
Major, CWS,
Chief, Plant Protection Division.

SPCVJ 160/5 Conf. 3d Ind.
(166-43)
WD, SOS, OC CWS, Washington, D.C. January 13, 1943. To: The Chief, Internal Security Division, Office of the Provost Marshal General, 1741 Munitions Building, Washington, D.C.

1. Forwarded for your information.

For the Chief, CWS:

HENRY G. BAKER, JR.,
Major, CWS,

For: JAMES C. SAWDERS,
Lt. Col., CWS,
Asst Chief, Industrial Division.

basic letter, 1-6-43, fm Chicago CW PD to St. Louis Plant, subject: Reported Organization of Guards.
1st Ind. fm St. Louis Plant to Chicago CW PD 1-9-43.
2d Ind. fm Chicago CW PD 1-11-43. "

FILE SOURCE: to Under Secretary of War, 30 Aug 41

FILE: CWS File No. 319.1/250 - Spec #2

Sample Progress Report

Documents: Monsanto Plant

NOTE TAKER: L3/ki

COMMENTS: (38) Historical Data

"Chemical Warfare Service Plants for U.S. Army - Report as of August 22, 1941 — Monsanto, Ill. * Plant

2. (a) Date construction operations started: February 1, 1941
(b) Estimated completion date for construction: September 26, 1941
(c) Percentage of construction completed to date covered: 76.7%
(d) Latest estimated cost of equipment f.o.b. project: $793,230
(e) Estimated % of machines, tools, and equipment actually ordered to date: 97%
(f) Estimated % of machines, tools, and equipment actually received to date: 40%
(g) Statement of any difficulties encountered or anticipated:
(h) Total estimated cost: $2,463,310
(i) Expected date of initial operation: November 10, 1941
(j) Expected date of full production: December 1, 1941

*This plant formerly reported as St. Louis, Missouri plant."

A Cml C 13-12A Rev. 29 Jan. 48

CONFIDENTIAL

HISTORICAL DATA

FILE SOURCE: "Resume of Activities, Office of the Chief, CWS, for Week Ending 30 March 1944."

SUBJECT-SUBDIVISION

NAME

NOTE TAKER: L3/hmb

COMMENTS

* * *

"INDUSTRIAL DIV: Construction of S-330 at Monsanto, St. Louis Plant, at cost of $437,500, has been authorized. Contracted with Solvay Sales Corp. for sale of 3,432,450 lbs ammonium chloride repossessed from Russian Lend-Lease at $3.25 per CWT. Arrangements made to transfer to Navy 1,000,000 lbs of like repossessed potassium nitrate, and to transfer to QM 139,000 lbs excess ethyl alcohol. Three contracts approved for sale of accumulated scrap tin cans, wooden slack barrels and paper. Surplus property sales included 100,000 lbs sheet steel at $3.75 per CWT; 52,273 lbs steel strip at $5.40 and 301,620 lbs steel strip at from $1.50 to $1.60. April shipping instructions on Out-of-District component schedules were released." * * *

* * *

A Cml C 1-7A (9 Aug 48)

CONFIDENTIAL

WR 27123

WAR DEPARTMENT

ST. LOUIS PLANT

CHEMICAL WARFARE SERVICE

MONSANTO (EAST ST. LOUIS), ILL.

IN REPLY REFER TO:

15 September 1944

SUBJECT: Inspection Report

TO: Chief, Industrial Division
Office of Chief, Chemical Warfare Service
Gravelly Point, Washington 25, D. C.

1. Attached herewith is Inspection Report covering the St. Louis Plant, Chemical Warfare Service, office and plant.

HERBERT P. HEISS
Colonel, C.W.S.
Supervisory Inspection Officer, Industrial Div.

HPH:cg
Incls.

RECEIVED
SEP 18 AM 10 56

ST. LOUIS PLANT, CHEMICAL WARFARE SERVICE
Monsanto Chemical Company, Contractor Operator

CC-2 Plants
S-330 Plant

I. PERSONNEL - Civilian employees - 269 (234 male)
(35 female)

II. FUNCTIONS

1. Plant - There are three wholly owned Government plants in this installation; two CC-2 Plants and one S-330 Plant. One CC-2 Plant has been placed in standby condition with the exception of part of the equipment, which is being used to assist in the operation of the S-330 Plant. The two CC-2 Plants have a combined capacity of approximately 750,000# per month. At the present time they are operating on a basis of about 250,000# to 300,000# per month.

2. Management - From the observation of this officer, management of this installation is very satisfactory.

3. Generally speaking, housekeeping is as satisfactory as is found in general commercial manufacturing practice. Minimum corrosion was noted on most of the equipment, however, preventive maintenance is practiced at all times by this company, and everything that is possible is being done to maintain the equipment in A-1 condition. It was noted in Plant Number 1, which is partly in standby, is maintained in very satisfactory condition. All valves and motors, flanges and piping have been reworked and painted throughout the entire plant.

4. Maintenance - A crew of approximately 67 mechanical men operate as the maintenance crew in maintaining the equipment, in addition to performing other necessary functions keeping equipment in working order throughout the operating plants.

5. Labor Conditions - Absenteeism amounts to 2.6%. While this area is classified as a Number four labor area, considerable difficulty has been encountered in obtaining the required amount of labor.

Employees of this installation belong to a local branch of the American Federation of Labor, and up to this date no strikes have been called.

6. Medical Facilities - A first-aid station, including a nurse and doctor who reports three times a week are available

6. for the employees, and each employee is examined upon employment. Periodical examinations are given to those who evidence any signs of poisoning or respiratory diseases as a result of working in the toxic area.

7. Safety Programs - Active safety programs are carried out, and one man designated as a safety engineer has been assigned to devote his entire time to safety work. Safety plant examinations are made every month. In addition, a safety committee has been appointed to meet weekly to discuss safety programs. Safety incentive programs have been placed in operation and prizes of war bonds are given each month for constructive safety suggestions carried out by the employees.

8. Internal Security - Plant is enclosed with cyclone fencing, and guards stationed at the entries. There are a total of thirteen guards, who operate three on a shift with a fourth man working the day shift.

9. Electric Power and Water - Electricity is furnished by the Union Electric Company of St. Louis, Missouri, and the water is furnished by the East St. Louis City Water Company. Below is a tabulation of the amount of electricity and water used during the month of July for the S-330 and CC-2 Plant.

	S-330	CC-2
Electric	157,248 K.W.H. in July	397,000 K.W.H. in July
Water - a. City	4,633,000 gal.	8,692,250 gal. in July
b. Well	4,634,175 gal.	26,707,000 gal. in July

10. Steam - Steam is furnished by the Monsanto Chemical Company from their Monsanto power plant under contract with the Chemical Warfare Service. Below is a tabulation of the amount of steam used during the month of August for the S-330 and CC-2 Plants.

S-330	CC-2
3,585,000# in August	8,331,000# in August

11. Fire Preventive Equipment - There are eleven fire hydrants and ten hose houses located within the area near the plant. The Fire Department is made up of various members of the operating department in the plant, and fire drills are held twice a month to acquaint the fire department with necessary fire prevention practices.

ST. LOUIS PLANT, CWS, OFFICE

I. COMMANDING OFFICER - Major J. T. Baughman is Commanding Officer of this installation, and has been on duty since August 26, 1943.

II. ORGANIZATION AND PERSONNEL

1. CWS Office
   a. Commissioned officers - 2 (Major and First Lieutenant)
   b. Civilian employees - 8 (1 male, 7 female)

2. Upon inspection of this office it was found that no surplus office equipment is available. Recommendations were made to the Commanding Officer to consolidate his files, and bring the property records up to date, which is currently being accomplished.

III. RECOMMENDATIONS

1. No reduction in the personnel of this office is recommended at this time since this personnel is being used for all work
3. in connection with the operation of both the S-330 and the CC-2 plants.

ST. LOUIS PLANT, CWS, INSPECTION OFFICE

I. CHIEF - Mr. E. C. Eaton is the civilian Inspector-in-Charge.

II. ORGANIZATION AND PERSONNEL

1. Inspection Division
   a. Commissioned Officer - None
   b. Civilian employees - 2 female laboratory operators

III. RECOMMENDATIONS

1. As a result of observations made by this officer, consideration should be given to increasing the personnel in the Inspection Division by one stenographer. At the present time the stenographic work required in the Inspection Division has been supplied periodically by the C.W.S. Commanding Officer at this installation, which has sometimes delayed the proper functioning of the Industrial Division office.

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ST. LOUIS PLANT, CHEMICAL WARFARE SERVICE
Monsanto Chemical Company, Contractor Operator

CC-2 Plants
S-330 Plant

I. PERSONNEL - Civilian employees - 269 (234 male)
(35 female)

II. FUNCTIONS

1. Plant - There are three wholly owned Government plants in this installation; two CC-2 Plants and one S-330 Plant. One CC-2 Plant has been placed in standby condition with the exception of part of the equipment, which is being used to assist in the operation of the S-330 Plant. The two CC-2 Plants have a combined capacity of approximately 750,000# per month. At the present time they are operating on a basis of about 250,000# to 300,000# per month.

2. Management - From the observation of this officer, management of this installation is very satisfactory.

3. Generally speaking, housekeeping is as satisfactory as is found in general commercial manufacturing practice. Minimum corrosion was noted on most of the equipment, however, preventive maintenance is practiced at all times by this company, and everything that is possible is being done to maintain the equipment in A-1 condition. It was noted in Plant Number 1, which is partly in standby, is maintained in very satisfactory condition. All valves and motors, flanges and piping have been reworked and painted throughout the entire plant.

4. Maintenance - A crew of approximately 67 mechanical men operate as the maintenance crew in maintaining the equipment, in addition to performing other necessary functions keeping equipment in working order throughout the operating plants.

5. Labor Conditions - Absenteeism amounts to 2.6%. While this area is classified as a Number four labor area, considerable difficulty has been encountered in obtaining the required amount of labor.

Employees of this installation belong to a local branch of the American Federation of Labor, and up to this date no strikes have been called.

6. Medical Facilities - A first-aid station, including a nurse and doctor who reports three times a week are available

6. for the employees, and each employee is examined upon employment. Periodical examinations are given to those who evidence any signs of poisoning or respiratory diseases as a result of working in the toxic area.

7. Safety Programs - Active safety programs are carried out, and one man designated as a safety engineer has been assigned to devote his entire time to safety work. Safety plant examinations are made every month. In addition, a safety committee has been appointed to meet weekly to discuss safety programs. Safety incentive programs have been placed in operation and prizes of war bonds are given each month for constructive safety suggestions carried out by the employees.

8. Internal Security - Plant is enclosed with cyclone fencing, and guards stationed at the entries. There are a total of thirteen guards, who operate three on a shift with a fourth man working the day shift.

9. Electric Power and Water - Electricity is furnished by the Union Electric Company of St. Louis, Missouri, and the water is furnished by the East St. Louis City Water Company. Below is a tabulation of the amount of electricity and water used during the month of July for the S-330 and CC-2 Plant.

	S-330	CC-2
Electric	157,248 K.W.H. in July	397,000 K.W.H. in July
Water - a.City	4,633,000 gal.	8,692,250 gal. in July
b.Well	4,634,175 gal.	26,707,000 gal. in July

10. Steam - Steam is furnished by the Monsanto Chemical Company from their Monsanto power plant under contract with the Chemical Warfare Service. Below is a tabulation of the amount of steam used during the month of August for the S-330 and CC-2 Plants.

S-330	CC-2
3,585,000# in August	8,331,000# in August

11. Fire Preventive Equipment - There are eleven fire hydrants and ten hose houses located within the area near the plant. The Fire Department is made up of various members of the operating department in the plant, and fire drills are held twice a month to acquaint the fire department with necessary fire prevention practices.

12. Sewers - Sewage and sewage disposal facilities are adequate to meet the requirements of this installation.

REMARKS

1. In general the operation of this installation is satisfactory.

HERBERT [illegible]
Colonel, [illegible]
Supervisory Inspection Officer, Industrial [illegible]

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III. RECOMMENDATIONS

1. No reduction in the personnel of this office is recommended at this time since this personnel is being used for all work in connection with the operation of both the S-330 and the CC-2 plants.

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Monsanto Chemical Company, Contractor Operator

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(35 female)

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2. Management - From the observation of this officer, management of this installation is very satisfactory.

3. Generally speaking, housekeeping is as satisfactory as is found in general commercial manufacturing practice. Minimum corrosion was noted on most of the equipment, however, preventive maintenance is practiced at all times by this company, and everything that is possible is being done to maintain the equipment in A-1 condition. It was noted in Plant Number 1, which is partly in standby, is maintained in very satisfactory condition. All valves and motors, flanges and piping have been reworked and painted throughout the entire plant.

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12. Sewers - Sewage and sewage disposal facilities are adequate to meet the requirements of this installation.

III. REMARKS

1. In general the operation of this installation is satisfactory.

Herbert P. Heiss

HERBERT P. HEISS
Colonel, C.W.S.
Supervisory Inspection Officer, Industrial Division

SOU of War, 3 Oct 41

FILE CWS file No. 319.1/250 Spec #2

NOTE TAKER
LB/ki

COMMENTS

"1. Chemical Warfare Service Plants for U.S. Army - St. Louis, Missouri Plant

Report as of June 27, 1941

2. (a) Date construction operations started: February 1, 1941
(b) Estimated completion date for construction: September 26, 1941
(c) Percentage of construction completed to date covered: 45.9%
(d) The latest estimated cost for construction including overhead, etc.: $904,474.00
(e) Estimated date of completion of equipment and machinery installation: October 1, 1941
(f) Latest estimated cost of equipping the plant, including management fees, overhead, etc: $1,558,836.00
(g) Estimated cost of machines, tools, and equipment actually ordered to date: $520,602.94
(h) Value in dollars of machines, tools, and equipment actually received to date: $57,842.66

(i) ON NEXT PAGE!!

A Cml C 13-12A Rev. 29 Jan. 48

SOURCE Progress Report on Industrial Facilities Program, 15 Aug 41, C Industrial Serv OC CWS to Assist. Secretary of War, 25 Aug 41

SUBJECT-SUBDIVISION ←

NATURE OF NOTE Proc. - ST. Louis PLAN

FILE CWS File No. 319.1/250 - Spec #2

NOTE TAKER
LB/ki

COMMENTS

"1. Chemical Warfare Service Plants for U.S. Army - St. Louis, Missouri Plant

Report as of August 15, 1941

2. (a) Date construction operations started: February 1, 1941
(b) Estimated completion date for construction: September 26, 1941
(c) Percentage of construction completed to date covered: 72.7%
(d) Latest estimated cost of equipment f.o.b. project $817,130
(e) Estimated % of machines, tools, and equipment actually ordered to date: 93%
(f) Estimated % of machines, tools, and equipment actually received to date: 30%
(g) Statement of any difficulties encountered or anticipated: ----
(h) Total estimated cost: $2,463,310
(i) Expected date of initial operation: January 1, 1942
(j) Expected date of full production: February 1, 1942"

A Cml C 13-12A Rev. 29 Jan. 48

(i) Value in dollars of machines and equipment completely installed or erected to date plus value of tools, etc. received which do not involve installation costs: 00
(j) Statement of any difficulties encountered or anticipated: --
(k) Total estimated cost: $2,463,310.00 .

Note: Equipment shipments are to be divided between the St. Louis, Missouri plant and the Midland, Michigan plant."

(DUP)

SOURCE	Progress Report on Industrial Facilities Program, 15 Aug 41, C Industrial Serv OC CWS to Assist. Secretary of War, 25 Aug 41	SUBJECT-SUBDIVISION ←	NATURE OF NOTE Proc. - ST. Louis Plant
FILE	CWS File No. 319.1/250 - Spec #2		

NOTE TAKER
LB/kd

COMMENTS

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(h) Total estimated cost: $2,463,310
(i) Expected date of initial operation: January 1, 1942
(j) Expected date of full production: February 1, 1942"

30 November 1944

SUPPLEMENT NO. 1
TO
FACILITY INVENTORY REPORT
ST. LOUIS CWS PLANT
MONSANTO, ILLINOIS

The facility covered by this supplemental report was omitted from the original inventory report by authority of letter from Office of the Chief of Engineers, file CE 600.1 SPEMP, dated 1 March 1944 subject: Industrial Facilities Inventory Reports. This facility was constructed in the original project as a "DAT Plant" but at the time of writing of the original report it was being converted to the manufacture of a different product and this conversion involved considerable changes in equipment and piping.

This supplement then is intended to include in the Facility Inventory Report of the St. Louis CWS Plant the pertinent data covering the building shown on the plot plans of the original report as building No. 1, Manufacturing Building for DAT.

The utility site plans of the original report as well as several sections of the report which have no reference to this building remain unchanged. Where data is given in this supplement it is intended to apply only to this building and work pertinent thereto and in all cases is an addition to the data given in the original report.

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1 — 30 November 1944

INDEX

Part I, Section 1 General Data

1. CONTRACT NUMBER:

a. A.E.M, DA-W-266-CWS-1, Suppl. B.
b. Construction W-23-065-eng-319
c. Operating W-49-057 CWS-15

9. PRODUCTION:

a. Major products: Special product S-330
b. Principal By-products: None

10. PRODUCTIVE AREA: 19,878 sq. ft.

11. NON-PRODUCTIVE AREA: 802 sq. ft.

12. TOTAL PLANT AREA: 20,680 sq. ft.

13. MAXIMUM EMPLOYMENT:

a. First Shift	13
b. Second Shift	13
c. Third Shift	13
Total	39

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1
30 November 1944
PART I, Section 2
Present Employment

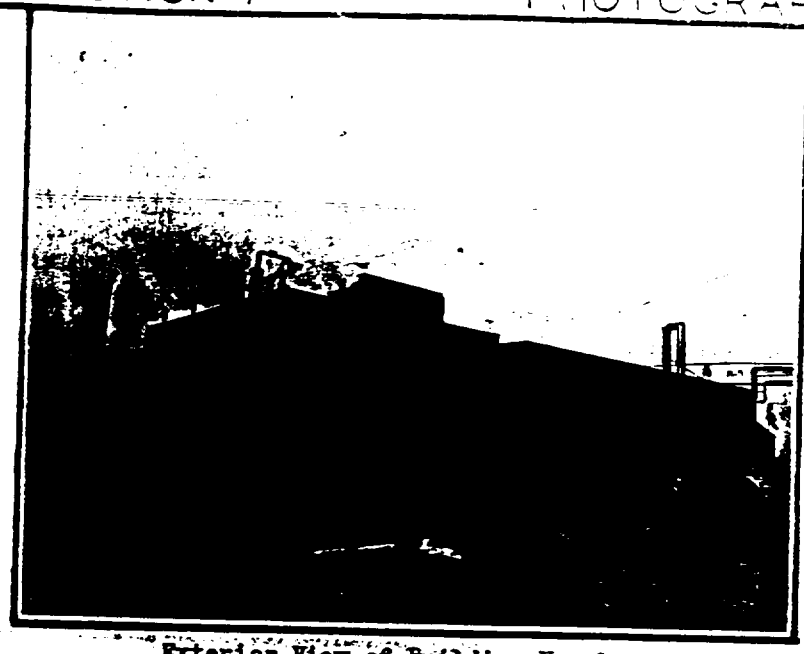
PROJECT: ST. LOUIS CWS PLANT					DATE: 1 November 1944
CLASS	White Male	White Female	Negro Male	Negro Female	Total
PRODUCTIVE					
Highly Skilled	39	0	0	0	39
Skilled	0	0	0	0	0
Semi-Skilled	0	0	0	0	0
Unskilled	0	0	0	0	0
NON-PRODUCTIVE					
Skilled	0	0	0	0	0
Semi-Skilled	0	0	0	0	0
Unskilled	0	0	0	0	0
Total	39	0	0	0	39

ST. LOUIS O/S PLANT
SUPPLEMENT NO. 1 — 30 November 1944

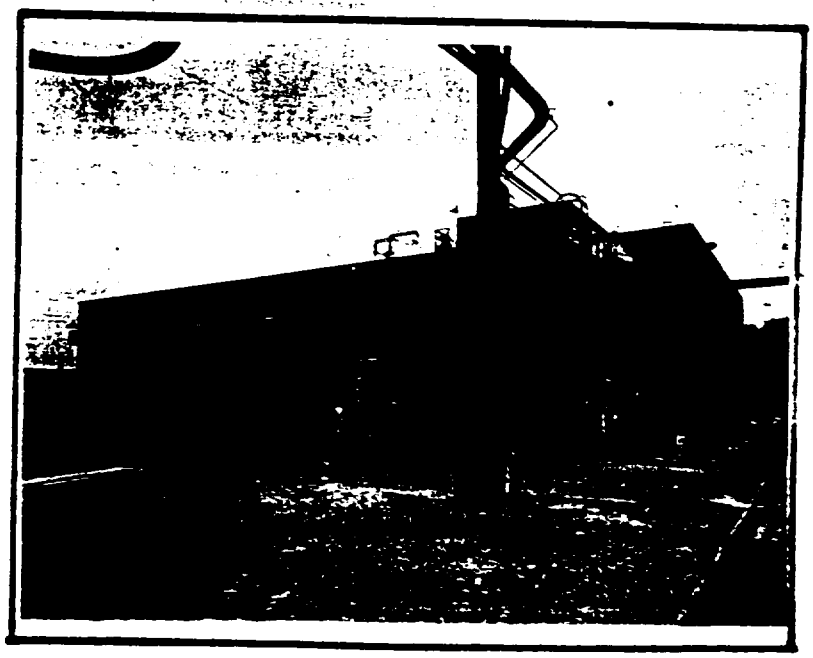
Part I, Section 7 — Photographs

INDEX

PART I SECTION 7 PHOTOGRAPHS

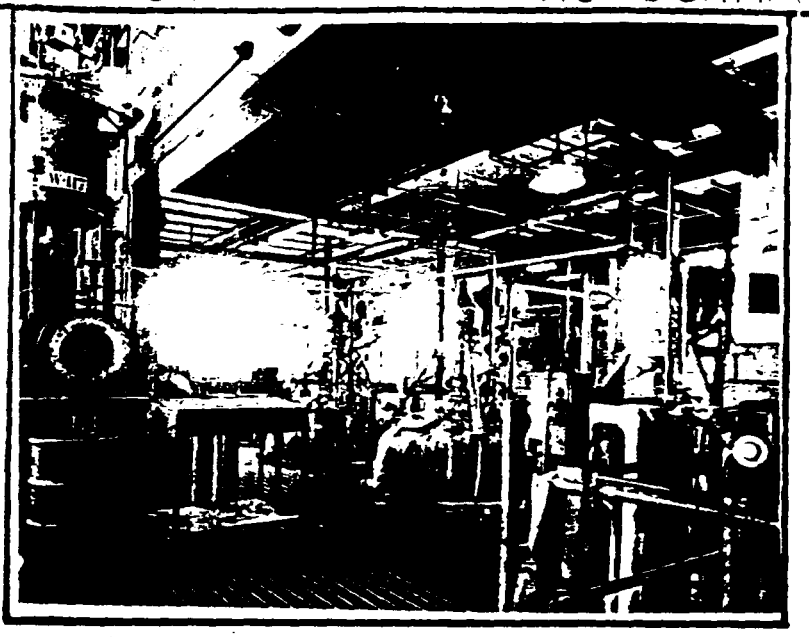


Exterior View of Building No. 1,
Looking Northeast

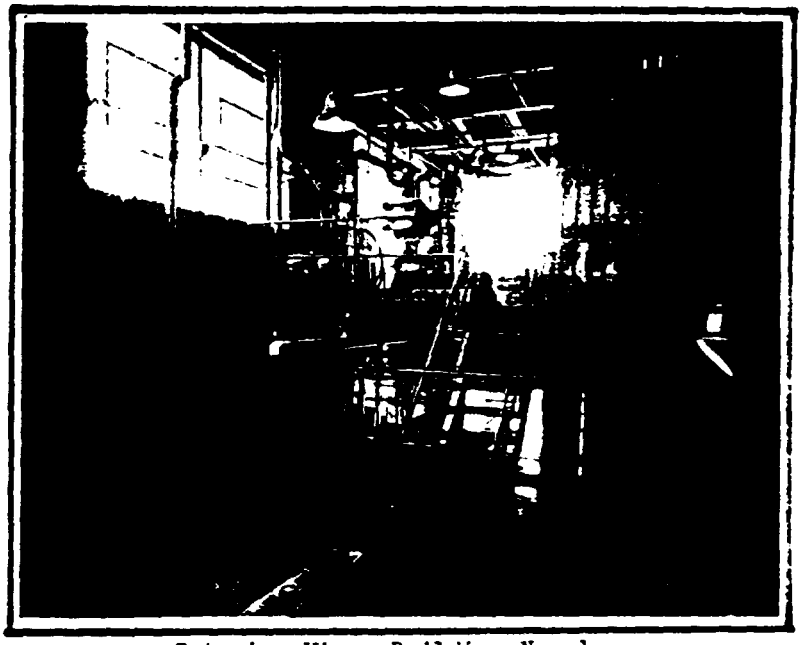


Exterior View of Building No. 1,
Looking North

PART I SECTION 7 PHOTOGRAPHS



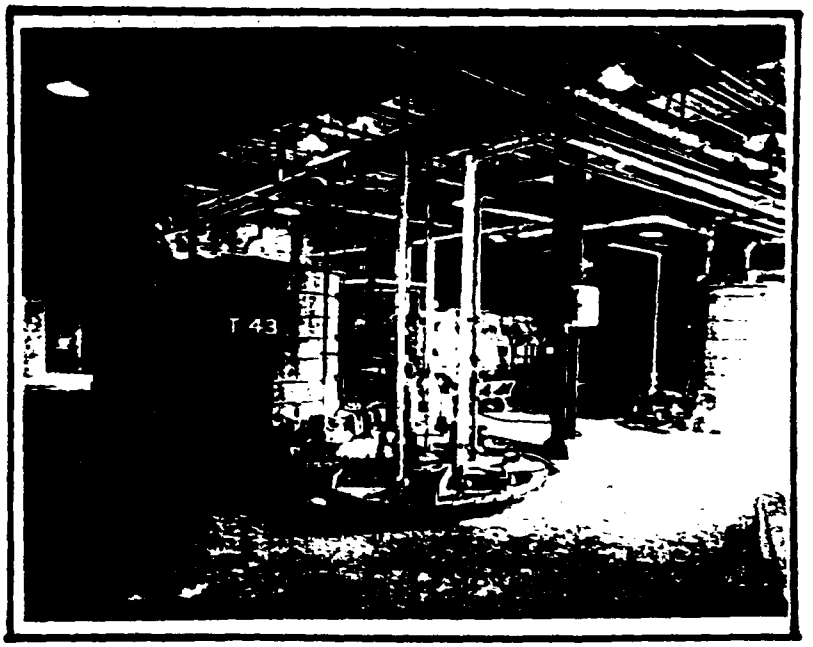
Interior View, Building No. 1,
Reactor - Agitator



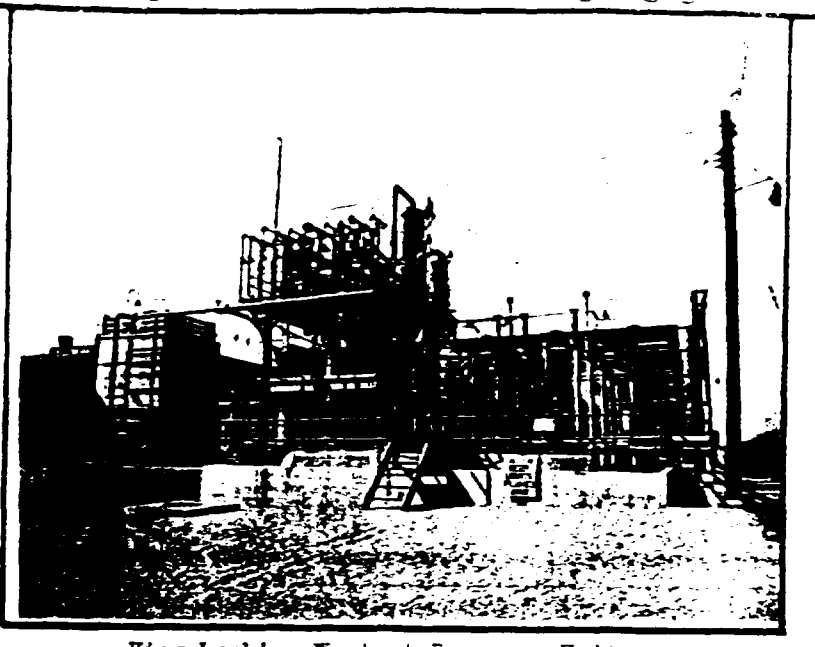
Interior View, Building No. 1,
Reactor and Condenser

PART I SECTION 7 PHOTOGRAPHS

Interior View, Building No. 1,
South "Reactor and Agitator Room"

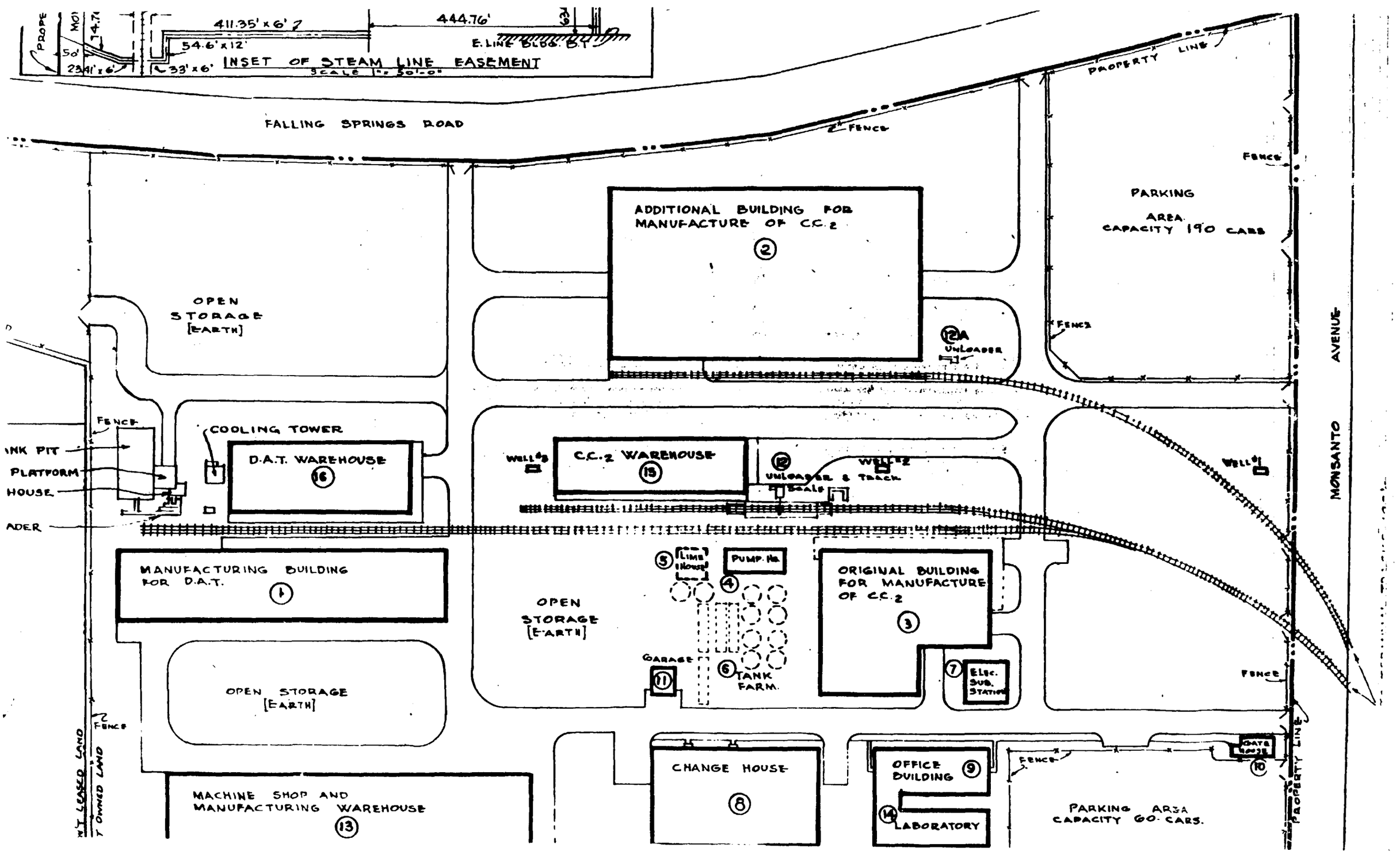


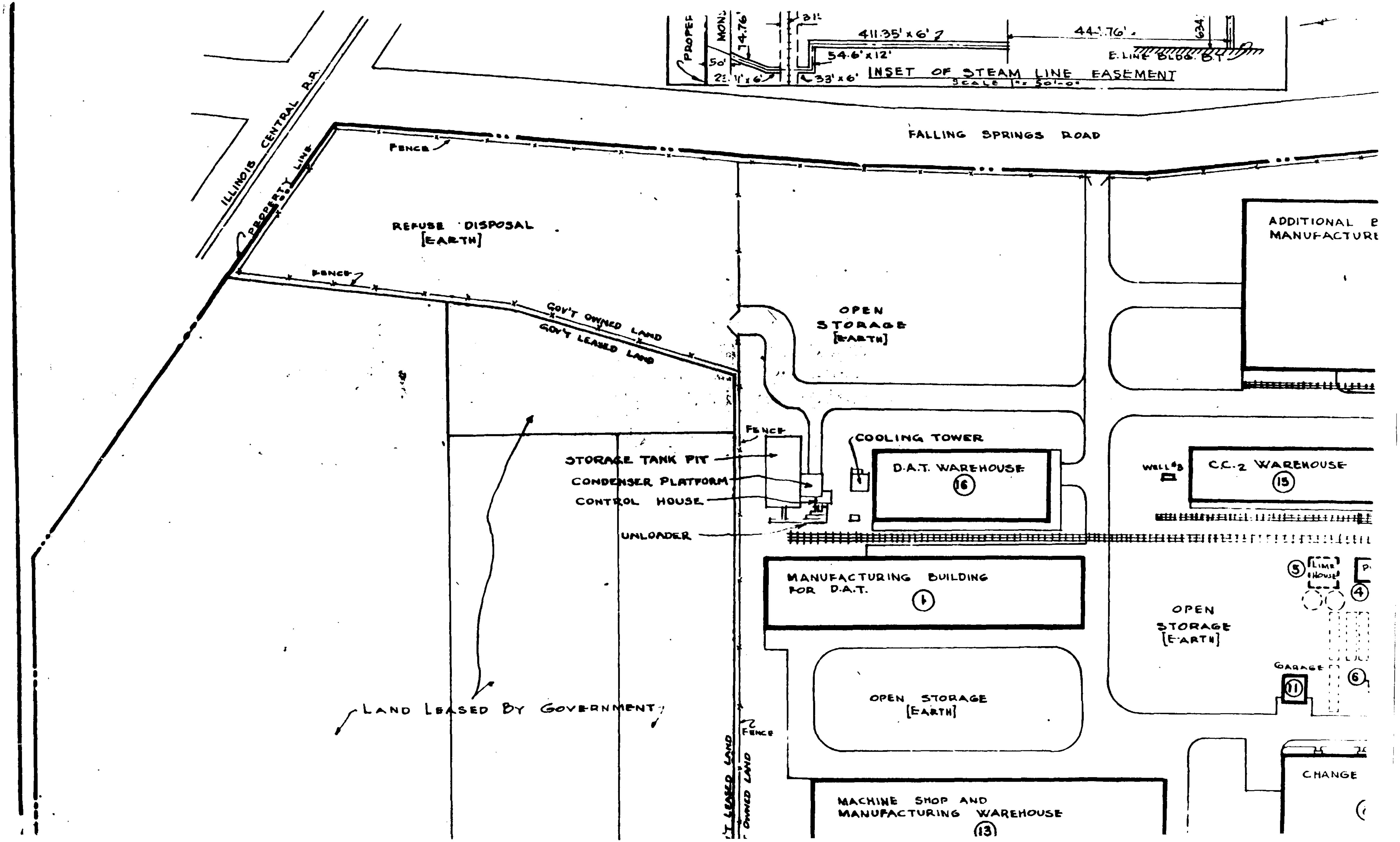
Interior View, Building No. 1,
"Pilot Line Room"



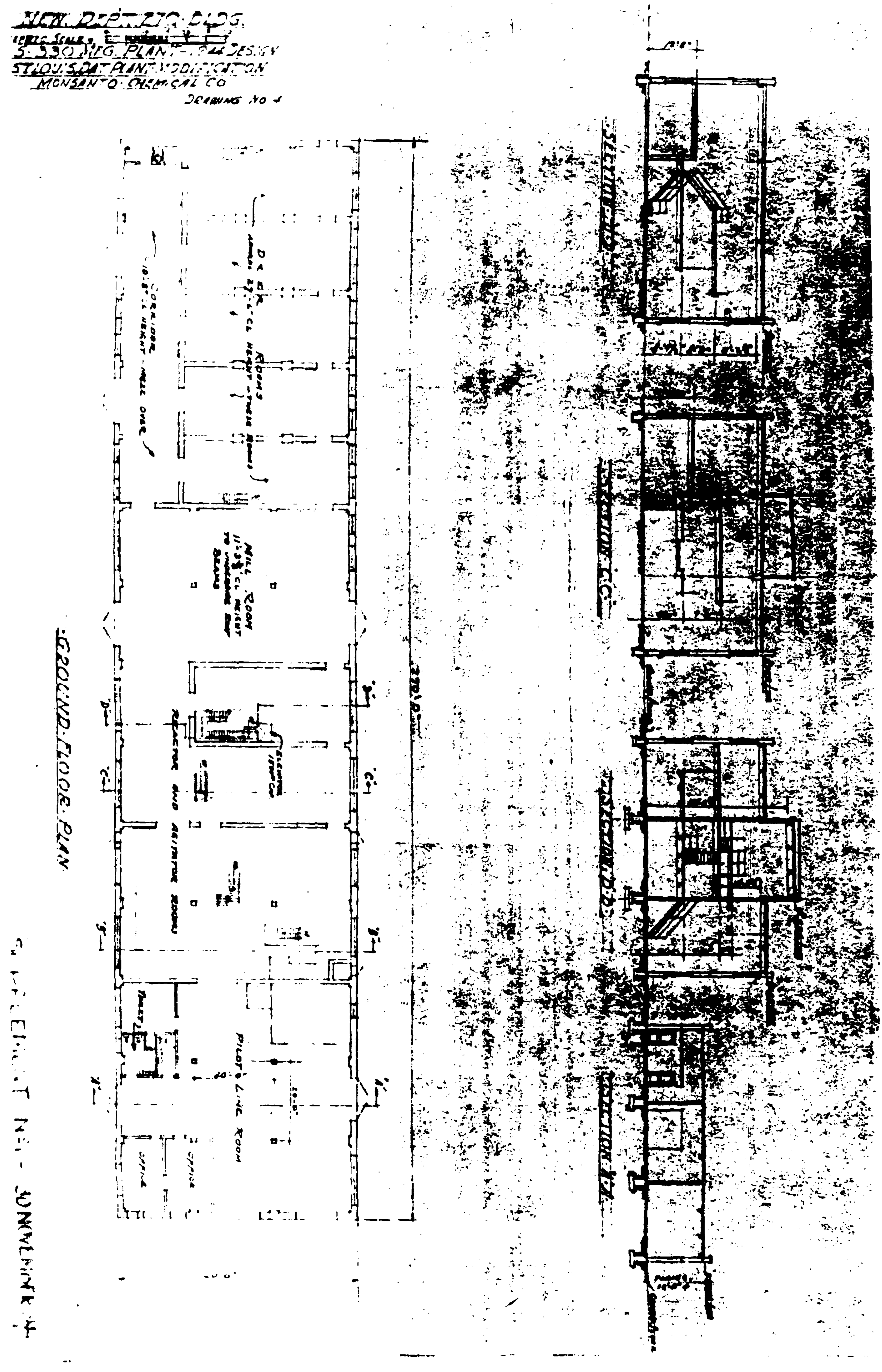
View Looking West at Recovery Unit,
Showing Cooling Tower, Condensers, and
Storage Tank Pit

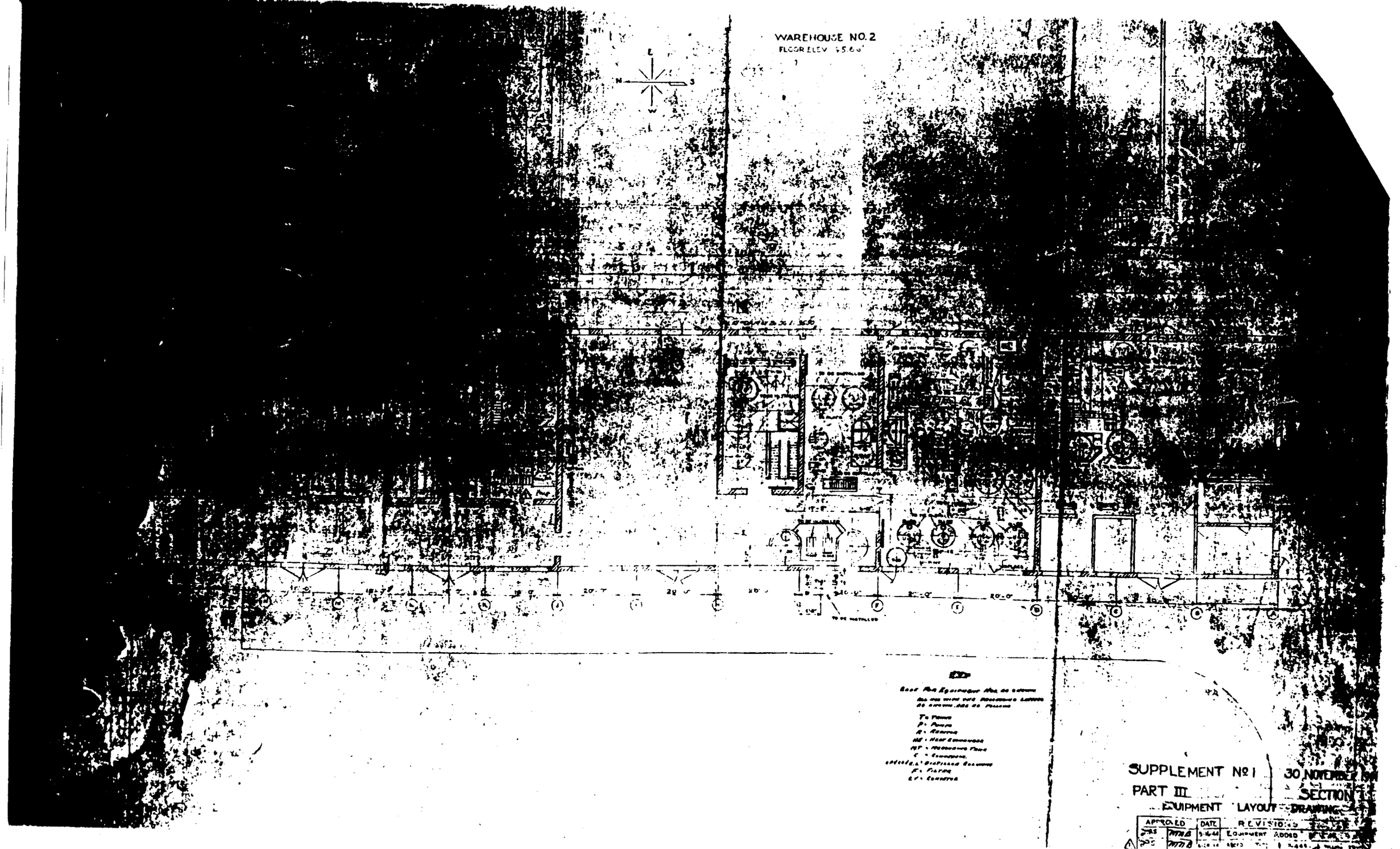
View Looking Northwest at Recovery Unit,
Showing Cooling Tower, Control House, Condenser,
and Storage Tank Pit


INSET OF STEAM LINE EASEMENT
SCALE 1" = 50'-0"
411.35' x 6'
444.76'
54.6' x 12'
33' x 6'
E. LINE BLDG. B-1
FALLING SPRINGS ROAD
PROPERTY LINE
FENCE
PARKING AREA CAPACITY 190 CARS
ADDITIONAL BUILDING FOR MANUFACTURE OF C.C.2
2
OPEN STORAGE [EARTH]
12A UNLOADER
MONSANTO AVENUE
COOLING TOWER
D.A.T. WAREHOUSE
16
WELL #3
C.C.2 WAREHOUSE
15
12 UNLOADER & TRACK SCALE
WELL #2
WELL #1
MANUFACTURING BUILDING FOR D.A.T.
1
5 LIME HOUSE
PUMP HO.
4
OPEN STORAGE [EARTH]
ORIGINAL BUILDING FOR MANUFACTURE OF C.C.2
3
GARAGE
11
6 TANK FARM
7 ELEC. SUB. STATION
OPEN STORAGE [EARTH]
CHANGE HOUSE
8
OFFICE BUILDING 9
14 LABORATORY
PARKING AREA CAPACITY 60 CARS.
10
13
MACHINE SHOP AND MANUFACTURING WAREHOUSE



INSET OF STEAM LINE EASEMENT
SCALE 1" = 50'-0"
411.35' x 6'
54.6' x 12'
33' x 6'
14.76'
50'
31'
E. LINE BLDG. B.T.
FALLING SPRINGS ROAD
ILLINOIS CENTRAL R.R.
PROPERTY LINE
FENCE
REFUSE DISPOSAL
[EARTH]
GOV'T OWNED LAND
GOV'T LEASED LAND
OPEN
STORAGE
[EARTH]
ADDITIONAL
MANUFACTURE
COOLING TOWER
STORAGE TANK PIT
CONDENSER PLATFORM
CONTROL HOUSE
UNLOADER
D.A.T. WAREHOUSE
16
WELL
C.C.-2 WAREHOUSE
15
MANUFACTURING BUILDING
FOR D.A.T.
1
LIME HOUSE
5
4
6
GARAGE
11
OPEN
STORAGE
[EARTH]
OPEN STORAGE
[EARTH]
LAND LEASED BY GOVERNMENT
CHANGE
MACHINE SHOP AND
MANUFACTURING WAREHOUSE
13


NEW DEPT. R&D BLDG.
MONSANTO CHEMICAL CO
DRAWING NO 4
GROUND FLOOR PLAN
MILL ROOM
CORRIDOR
PILOT LINE ROOM
REACTOR AND AGITATOR ROOMS


WAREHOUSE NO. 2
FLOOR ELEV. +5.6'
SUPPLEMENT Nº 1
PART III
EQUIPMENT LAYOUT DRAWING
SECTION
APPROVED
DATE
REVISIONS
Equipment Added

Building No. 1, Manufacturing Building

	Total Floor Area in Sq. Ft.				
	1st	2nd	3rd	4th	5th
1. Total productive area:	15,678	2,600	800	400	400
2. Total non-productive area:	802				
3. Laboratory & testing area:	200				
4. Office area:	280				

5. Cafeteria seating capacity: None

6. Toilet capacity:

	W.C.	Urinals	Lavatories
a. Men			
1. Colored	1	2	2
2. White	2	3	3
b. Women	None		

7. Locker capacity: None

8. Design and construction details:
   a. Floor construction: Concrete slab on fill-mezzanine floors are of steel grating except in North Portion over corridor which is of reinforced concrete.
   b. Floor finish (general area): Concrete or open steel grating.
   c. Structural frame: steel and masonry.
   d. Wall construction: Face brick - common brick backup
   e. Clear height: 8'0" to mezzanine; 28'-3-3/8" to underside of roof (see drawing)
   f. Design limits floor loads, lbs/sq. ft.: Main floor 500#/sq. ft.; all others 75#/sq. ft. plus equipment.
   g. Type of heating: Steam (unit heaters)
   h. Type of cooling: None
   i. Type of air filtration: None
   j. Power distribution
      1. Voltage: 440 and 110
      2. Type: conduit
   k. Type of lighting: Incandescent
   l. Type of fire protection: Sprinkler system
   m. Type of soil: Sandy loam
   n. Type of foundations: Concrete pile - South portion
      Concrete spread footings - North portion
   o. Design soil pressures: 20 tons per pile and 1500 #/sq. ft.
   p. Roof deck construction: Cement and tile - South portion
      2" wood planking - North portion
   q. Roofing:
      1. Type: 4 ply tar and gravel
      2. Guarantee: 15 year
   r. Roof insulation: 1" Celotex - South portion only
   s. Description of other process piping layouts: none

9. Notes of special features: Elevator with capacity of 1500# and lift of 17' is installed.

[redacted]

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1 — 30 November 1944

Part I, Section 11 — Data on Utilities

1.	LAND AREAS	Government Owned	15.711
		Leased	6.134
		Total	21.845

4. NUMBER OF BUILDINGS: (This supplement) 1

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1 — 30 November 1944

Part II, Section 1 — Records, Capacities and Special Features

1. LOCATION AND CUSTODIANSHIP OF RECORDS

b. AUDIT OF COST: U. S. Engineers Office, St. Louis District, St. Louis, Missouri

e. CONFORMED COPY OF CONSTRUCTION CONTRACTS: U. S. Engineers Office, St. Louis District, St. Louis, Missouri

3. DATE CONSTRUCTION STARTED: 16 March 1944

4. DATE CONSTRUCTION COMPLETED: 11 August 1944

5. DATE OPERATOR ACCEPTED PLANT: 11 August 1944

6. DATE OF INITIAL OPERATION: August 1944

7. DESIGN CAPACITY: 125,000 lbs. of S-330 per month at 24 hours per day, 7 days per week, 3 shifts per day.

8. MAXIMUM ATTAINED CAPACITY: 175,000 lbs. of S-330 per month (attained during the month of October 1944) at 24 hours per day, 7 days per week, 3 shifts per day.

9. PRESENT OPERATING RATE: 6,000 lbs. of S-330 per day at 24 hours per day, 6 days per week, 3 shifts per day.

11. ANY SPECIAL CONTRACTURAL FEATURES

a. OWNERSHIP OF LAND.

1. 15.738 acres - War Department, U. S. Government
2. 6.134 acres - Under Lease
3. 3.60 acres - Title is held in the name of lessor, Illinois Central Railway Co.
4. 0.874 acres - Title is held in the name of lessor, American Zinc Company
5. 1.66 acres - Title is held in the name of American Zinc Company.

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1 — 30 November 1944

Part II, Section 3 — Summary of Costs

Schedule I	**Land and land improvements**	
	(a) Land	$ 0
	(b) Land improvements, such as grading landscaping, roads, curbs, drainage, etc.	31,924
	Total I	31,924
Schedule II	**Building, etc.**	
	(a) Buildings	275,684
	(b) Building installations (not mechanical)	54,161
	(c) Leasehold improvements	47,295
	(c-1) Off leasehold improvements	0
	(d) Service costs	37,713
	Total II	414,853
Schedule III	**Machinery, equipment, etc.**	
	(a) Machinery Tools and Equipment (including cost of installation):	
	1. Machine Tools	0
	2. Other production equipment	330,399
	(b) Building installations (mechanical)	5,000
	(c) Laboratory and testing equipment	0
	(d) Furniture and fixtures	0
	(e) Plant protection	0
	Total III	335,399
Schedule IV	**Portable tools and automotive equipment**	
	(a) Portable tools	0
	(b) Automotive equipment	0
	Total IV	0
Schedule V	**Durable tools**	
	(a) Special jigs and fixtures	0
	(b) Special functional gages	0
	(c) Special dies, patterns, etc.	0
	Total V	0
	GRAND TOTAL	$782,176

ST. LOUIS CWS PLANT
SUPPLEMENT NO. 1 — 30 November 1944

Part II, Section 4 — Detail Building Costs

Building No. 1

Plumbing	8,675	
Fire Protection	7,295	
Heating and Ventilation	6,992	
Electrical	29,999	
Architectural Trades	275,684	
Compressed Air Piping	1,200	
Total		$329,845

Leasehold Improvements

Electrical	11,281	
City Water Lines	3,723	
Well Water Lines	6,730	
Sanitary Sewers	12,504	
Steam Supply	5,220	
Railroads	3,510	
Fencing	4,227	
Total		$ 47,295

ITEM AND SERIAL OR PROPERTY NUMBER	NO. UNITS	MAKE	SIZE	TYPE	YEAR BUILT	F.O.B. FACTORY	INSTALLED COST
Column, Fractionating, CL 455	1	Vulcan	37' 3" O.A. height	Ethanol Recovering	1943	4220.00	19,850.96
Motor, electric, TA3520	1	General Electric	10 H. P.	220/440 V. 3ph. 60 cy.	1943	166.46	371.98
Motor, electric, TA 2548	1	Westinghouse	7½ H.P. 1800 R.P.M.	220/440 V. 3ph. 60 cy.	1943	127.10	284.03
Pump, Recirculating acid, 5993	1	Duricon	2½"x 1½" 40 G.P.M.	Centrifugal W/Motor	1943	180.81	850.53
Pump, Reflux to column, 34628	1	Weiman	G.B.1	6 Centrifugal W/Motor	1943	114.00	536.26
Pump, Feed column, 1186590 & 1186589	2	Worthington	3"x 2"x 3"	Steam, Piston	1944	21[illegible].00	987.84
Pump, L-1 Storage, 1191776 & 1191773	2	Worthington	4½"x 2-3/4" x 4"	Steam, Piston	1944	292.00	1,373.58
Pump, Tank car unloading, 1191772 & 1191774	2	Worthington	4½"x 2-3/4" x 4"	Steam, Piston	1944	292.00	1,373.58
Pump, Mother liquor Tran., 1191770 & 1191771	2	Worthington	4½"x 2-3/4" x 4"	Steam, Piston	1944	292.00	1,373.58
Pump, Water, Circulating, SD 1095 & SD 1096	2	Pomona	12" - 3 Stage	Vertical - centrifugal	1944	2136.00	10,047.78
Still, stripping, K5714.2	1	Pfaudler	1,000 gal. - 66" x 57"	All steel glass lined	1942	3000.00	14,112.06
Still, stripping, 22780.1	1	Pfaudler	1,000 gal. - 66" x 57"	All steel glass lined	1943	6643.00	31,248.81
Tank, constant level, T72	1	Alpha	36" high	Welded all steel	1944	156.00	733.83
Tank, constant level, T6	1	Alpha	2'5" O.A.H. x 18" I D	Welded all steel	1944	107.00	503.33
Tank, storage distillate, T62, T67, & T68	3	Vulcan	5' 4½" x 24'0" 4000 gal.	Horizontal, steel	1943	1425.00	4,943.82
Tank, storage Fresh L-1, T59, T60, & T61	3	Vulcan	5' 4" x 24' 0" 4000 gal.	Horizontal, steel	1943	1425.00	4,943.82

ITEM AND SERIAL OR PROPERTY NUMBER	NO. UNITS	MAKE	SIZE	TYPE	YEAR BUILT	F.O.B. FACTORY	INSTALLED COST
Tank, storage Mother Liquor, T65	1	Nooter	10' x 10'	Vertical, mild steel	1944	1500.00	5,204.02
Tank, Recirculating, 3866B	1	Vulcan	42" O.D. x 60" high	Welded steel	1944	200.00	693.87
Tank, Storage column feed, T66	1	Nooter	12' x 12' 375# sq. in.	Welded steel	1944	1800.00	8,467.24
Tower, cooling, TO-1	1	Marley		Vertical forced draft	1942	1275.00	5,997.63
Mill, comminuting Raw. 0-4, 44157	1	Raymond	12" W/Motor	Comminuting	1944	687.77	1,536.94
Screen, jigger, 4091	1	Kaysing	24" W/Motor	V-Belt driven	1944	1398.00	3,124.07
Motor, electric, T.A. 2929, 2930, & 2947	3	General Electric	15 H. P.	220/440 V 3ph. 60 cy.	1944	553.50	1,236.90
Reactor, 22728.1	1	Pfaudler	6'6" x 5'7" 1000 gal.	Glass lined	1942	6466.00	30,416.19
Tank, Measuring L-1, T 70	1	Vulcan	4'6" x 4'4"	Welded steel	1942	100.00	555.10
Dissolver, 22781.3, 22781.1, 22781.2, & 22780.2	4	Pfaudler	1000 gal.	Steam jacketed glass lined	1942	26572.00	124,995.24
Motor, Electric, CX19717	1	General Electric	7½ H.P. 1735 R.P.M.	220/440 V. 3 ph. 60 cy.	1944	127.00	283.80
Motor, Electric, 66142	1	Westing-house	15 H.P.	220/440 V. 3 ph. 60 cy.	1944	127.00	283.80
Motor, Electric, DW9702 & DW 20389	2	General Electric	15 H.P. 1800 R.P.M.	220/440 V. 3 ph. 60 cy.	1944	200.00	446.94
Motor, Electric, 689543	1	Westing-house	15 H.P. 1750 R.P.M.	220/440 V. 3 ph. 60 cy.	1944	185.00	413.41
Motor, Electric, 3740 & 140	2	Westing-house	25 H.P.	220/440 V. 3 ph. 60 cy.	1944	400.00	893.86
Motor, Electric, 2950	1	General Electric	7½ H.P.	220/440 V. 3 ph. 60 cy.	1944	127.10	283.80
Press, Filter, 15806	1	T. Shriver	36" 50 Ton	Quick Opening	1942	550.00	1,908.14

ITEM AND SERIAL OR PROPERTY NUMBER	NO. UNITS	MAKE	SIZE	TYPE	YEAR BUILT	F.O.B. FACTORY	INSTALLED COST
Pump, Filter Press, 433	1	Duriron	3"x 2" 50 G.P.M.	Durichlor	1944	300.00	1,040.80
Pump, Reslurry, 191408	1	American Marsh	5"x 3" x 6"	Simplex Horiz. Steam	1944	149.32	702.40
Pump, Filtrate sump., DC 76556	1	Deming	1A 50 G.P.M.	Vertical Centrifugal	1944	366.27	1,270.72
Scale - 0-6 weighing, 697167	1	Toledo	0# to 1000# by 1#	Automatic	1944	363.61	812.55
Tank Sump, T31	1	Alpha	5' x 6'	Steel Welded	1944	528.00	1,831.82
Chlorinator, R52	1	Pfaudler	500 gal.	Steel, glass lined	1942	4704.00	22,127.71
Motor, electric, BY 12167	1	General Electric	7½ H. P.	220/440 V. 3 ph. 60 cy.	1944	127.00	283.80
Pump, mother liquor, 520 & 521	2	Duriron	50 G.P.M.	Mod. 40 w/motor	1944	596.00	2,803.60
Tank drowning, T41	1	Haveg	60" x 84" 1000 gal.	Haveg	1944	175.00	607.84
Tank Measuring, T57 & T58	2	Goodrich	2'6" x 3" O.D.	Rubber lined steel	1944	437.00	1,516.10
Tank Measuring Mother Liquor, T40	1	Goodrich	4'6" x 4'4"	Rubber lined steel	1944	689.02	2,390.45
Tank Storage Mother liquor, T38 & T39	2	Haveg	7' x 7' O.D.	Haveg "41"	1944	3580.00	12,420.26
Miscellaneous items with unit price less than $100						891.59	2,314.68
Grand Total - Production Equipment						76021.55	330,399.47

51 Historical Data

The following facilites were authorized during the first half of FY44:
additional cost (223,000) for the CC-2 plant
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Monsanto CC2 Plant

This facility was completed for initial operation during the first half of FY 1942

During the first half of FY43, a plant expansion was authorized and started.

Additional funds were authorized and construction started during FY (second half) 43 for additional equipment and increase in cost. (990,000)

Monsanto CC2 Plant was completed during FY43 (1,875,000).
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

St. Louis Plant - FY 1953: Congressional approval obtained and action taken by GSA to sell this plant [Operation Clean Sweep, 1958 - 1960]

Monsanto DT Plant

Facility was completed for intial operation during FY 1942

Monsanto DDT #2 was completed during FY43 (387,000).
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Niagara Falls CC2 Plant
see also Hooker

This facility was completed for initial operation during the first half of FY 1942

First Half of FY 1943: Numerous small facilities were authorized and started: New Plant (2,305,000)

Additional funds were authorized and construction started during FY (second half) 43 for additional equipment and increase in cost. (809,000)

Niagara Falls CC2 Plant #2 was completed during FY 43. (2,305,000)
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

Niagara Falls HC Plant

The following facilites were authorized during the first half of FY44:
addition cost for the HC plant
[History of (Construction) Facilities Section, Industrial Division, Chemical Warfare Service, 12/14/43]

History of the St Louis Plant

In the emergency period preceding World War II the Chemical Warfare Service constructed four impregnite plants at the following locations: Edgewood Arsenal; Niagara Falls, New York; East St Louis, Illinois; and Midland, Michigan. These plants were built from the same set of drawings which were made by the Du Pont Company. Du Pont was given a contract to operate the Niagara Falls Plant, the Monsanto Chemical Company a contract to operate the St Louis Plant, and Dow Chemical Company was awarded a similar contract on the Midland Plant. The CWS, itself, operated the plant at Edgewood Arsenal.

Construction of the St Louis plant got underway on 11 July 1941 on a tract of 5.757 acres purchased by the government directly north of the Monsanto works. By February 1942 construction was sufficiently advanced to enable the Monsanto Company to begin manufacturing on a preliminary basis. Difficulties at once arose because of corrosion, inadequacy of facilities and poor ventilation. After about five months, the plant capacity was 5,000 pounds a day instead of the projected 10,000 pounds. These difficulties were not confined to the East St Louis plant but were general throughout the other impregnite plants. In order to obtain planned production, it was necessary to make repairs and alterations to the plants. Monsanto reached a 10,000 pound capacity by November 1942. After still further improvements the company reached a 15,000 pound per day capacity in the original plant by 28 October 1943.__/

__/ Ltr, Wm. G. Krummrich, Div Prod Mgr, Monsanto Chemical Co. to Col Harry W. Lebkicher, Chicago CWPD, 18 Aug 44, no sub. This letter was in answer to a request by the CWS for an historical account of the plant. In CMLHO.

Meanwhile, from the fall of 1942 on CWS requirements for impregnite greatly increased, with the result that existing production capacity had to be about doubled. The government awarded contracts to Du Pont, Dow and Monsanto to expand their plants, but nothing was done to increase capacity at the Edgewood plant. In the case of Monsanto, that company designed and erected a new plant capable of producing 10,000 pounds of CC-2 a day. On 20 December 1943 this new plant was placed in operation and by early January 1944 combined production in the old and new plants reached 24,730 pounds per day.__/ By the close of World War II the St Louis Plant had produced approximately 10,850,000 pounds of CC-2, of which 1,700,000 pounds had been further processed into XXCC-3.__/

__/ Ibid.

__/ Historical Record of St Louis CWS Plant, dated June 9, 1945. This rpt was signed by Jas. F. Stickley, Manufacturing Superintendent. In CMLHO.

In addition to manufacturing impregnites at the St Louis Plant, Monsanto designed, supervised the construction of, and operated special plants for two other CWS products, Dichloramine-T and S-330. These products were used in different types of protective ointments.

On 1 July 1946 the CWS leased the plant to the Monsanto Company

with the provision that the company would perform plant maintenance.__/

__/ Report of Condition of St Louis Plant Lease No. W-11-114-ENG-3627, March 1956 by William Tarockoff, Ind Spec (Cml), Chicago CWPD and John Malone, Chicago Dist Engineers. File 280/26 St Louis Plant Survey. In Ind Res Div, MATCOM.

As of December 1949 Monsanto was utilizing 30 per cent of the plant and 60 per cent of the equipment for the manufacture of insecticides, herbicides, pharmaceuticals, and oil additives. Maintenance of the plant, which the Monsanto Company reported to cost over $300,000 a year, was considered satisfactory.__/

__/ (1) History of Chicago CWPD, 1 Jul 49 - 30 Dec 49, p. 16, and 1 Jul 50 - 31 Dec 50, p. 17. (2) Ltr Jas F. Stickley, Asst Plant Mgr, Organic Chemicals Div., Monsanto Chemical Co to Mr Carl Martini, Management Div., Office of Comptroller of Army, 20 Sep 50, sub: Maintenance of Chemical Warfare Service Plant, Monsanto, Illinois. File 280/26 St Louis Plant Survey. In Ind Res Div, MATCOM.

In the Korean War period the CWS made plans to recapture and rehabilitate the St Louis Plant in order to produce XXCC-3. Under these plans initial production would start about 1 January 1953. A change in requirements led to the abandonment of this plan.__/

__/ (1) History of Chicago CWPD, 1 Jan 52 - 31 Dec 52, p. 41. (2) Ltr, Col Clifford L. Sayre, CMLRE, 31 Oct 52, to OG, CmlC MATCOM, Attn: C, Ind Div, 31 Oct 52, sub: Reactivation of the St Louis Chemical Corps Plant. File 280/26 St Louis Plant 1950 - 1959. In Ind Res Div, MATCOM.

Beginning in July 1954 the Monsanto Chemical Company expressed strong misgivings on the capability of the East St Louis Plant to fill mobilization requirements for XXCC-3. At a conference held at that time in the New York Procurement District Monsanto representatives stated that it would take at least a year to reactivate the plant and they advised the government to construct an entirely new facility at some other location.__/ On 10 December 1954 the Monsanto Company offered

__/ See Memo C.L. Alberding, C Facilities Br [MATCOM] to Legal Advisor, 14 Sep 54, Sub: Impregnite XXCC3 Schedule No 247P Chemical Corps St Louis Plant, Monsanto, Ill. In File 280/26 St Louis Plant 1950 - 1959. In Ind Res Div, MATCOM.

to buy the Chemical Corps St Louis Plant. In later conferences held in Baltimore and Washington in December 1954 and January 1955 and through correspondence the company expressed willingness to cooperate with the Chemical Corps in fulfilling wartime S-330 production goals in the event the St Louis Plant were sold to Monsanto.__/ The company

__/ Ltr, R.M. Morris, Director of Manufacturing, Monsanto Chemical Co to P.A. Longo, C, Planning Div, 10 June 55, no sub. In file cited immediately above.

also at this time furnished the Chemical Corps with a brochure indicating that for a chemical plant the St Louis Plant must be considered old and costly to operate. The same brochure recommended that the Corps build

an entirely new plant.__/

__/ A copy of this brochure entitled "Assuring Adequate Quantity of XXCC3 and S330" is in file 280/26 St Louis Plant Survey in Ind Res Div, MATCOM.

A June 1955 the Hoover Commission Task Force Report on real property management contained the following statement relative to the St Louis Chemical Corps Plant:

> Both impregnite plants were inspected and the inactive facility was found to be in excellent condition for a chemical plant. The plant, under lease manufacturing insecticides was, in part, in poor condition, and it was believed that it would not be able to produce impregnite without extensive rehabilitation approximating $3 million.__/

__/ This quotation appears in ltr Col Gilbert P. Gibbons, C, Materiel Div to CG, CmlC MATCOM, 8 Nov 55. In file cited immediately above.

This comment led to a special investigation by a representative of the Chicago Chemical Corps Procurement District and a representative of the Chicago District Corps of Engineers. These investigators concluded that while the contractor had maintained the plant in accordance with acceptable industrial practices for chemical manufacturing plants, certain modifications should be made to the lease to insure even better maintenance and better housekeeping. They also recommended that the results of two industrial mobilization studies, one by Monsanto and the other by Parsons-Musick Company of Los Angeles, Calif., be reviewed to determine if manufacturing techniques at the St. Louis

Plant might be improved.__/

__/ Report on Condition of St Louis Chemical Corps Plant Lease No. W-11-114-ENG-3627, March 1956. Same file.

Recommendations of this nature were not, apparently, looked upon with favor by the Assistant Secretary of the Army, for on 12 September 1957 that official determined the St Louis Plant excess to the Department of the Army. The plant was subsequently turned over to the General Services Administration for disposal.__/

__/ Memo, William J. Hewitt Acting C, Ind Mob Planning Div, to CO, USA CWPD, 24 Jun 58, sub: St Louis Chemical Corps Plant - S-330, being 1st Ind to CMLAM-M-IPP (26 May 58). File 280/26 St Louis Plant 1950 - 59. In Ind Res Div MATCOM.

Prepared By:

Dr. Leo P. Brophy

February 1962